THE IRON AGE

New York, December 27, 1923

ESTABLISHED 1855

VOL. 112, No. 26

High-Speed Steel for Cast Tools

Electric Melting Practice—Proportioning and Handling the Charge—Molds and Heat Treatment

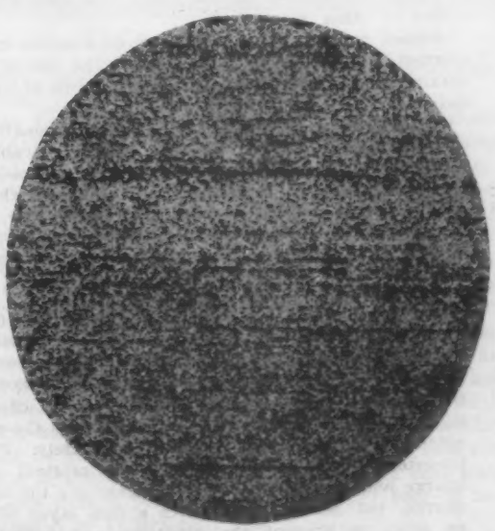
BY J. M. QUINN*

THE literature on high-speed steel gives few details concerning the actual making of the steel in the electric furnace and very little has been written regarding high-speed steel cast into semi-finished tools. The writer believes this is a subject in which many are interested. A description of the process follows:

A patent was granted not long ago from which sections are here quoted and it is enlightening to note that actual furnace practice closely follows the specifications of the letters patent except for certain details.

> The purpose of this invention is the production of a high-speed or other steel tool directly from the molten alloy by casting in the general form in which it is to be used without the preliminary casting in the ingot and the forging to form.
>
> In the manufacture of alloy steel tools, especially high-speed tools, it has been necessary to first cast the molten metal composition as an ingot and then mechanically work the metal to the desired tool form. The metal has not been cast directly in the form in which it is to be used, as when first cast the metal has such an internal structure as to be mechanically defective. This defective structure has been overcome, to a certain extent, by forging or other mechanical treatment and various annealing and heat treatments.
>
> The defective structure of the ingot casting is believed to be due to the presence of various impurities in the melt such as phosphorus and sulphur but even more to gaseous substances, occluded or otherwise associated with the metal.
>
> This invention consists in eliminating the causes which produce the defective structure in the ingot by producing a molten composition of such purity before casting that the operation may be effected directly in the general form of the tool desired, whereby the expensive forging and similar operations may be obviated.
>
> This is effected by selecting constituents of such purity and also so purifying and scavenging the melt prior to casting as to greatly reduce or eliminate these disturbing influences in the cast material.
>
> A specific example of a mode of applying the invention will now be given. A graphite crucible is charged with 20 parts of iron, preferably refined iron. This iron is in small fragments and to it is added 25¾ parts of ferrotungsten (80 per cent or eighteen parts being tungsten), 7½ parts of ferrochromium (60 per cent or 4½ parts being chromium) and 5 parts ferrovanadium (30 per cent or 1½ parts being vanadium). With a charge to total 100 lb., 8 oz. of ferromanganese is now added together with 8 oz. of S A M Lion Brand metal. Upon this mass in the crucible is dumped 40 parts more of the iron for the charge. The crucible is then intensely heated to bring the contents up to a uniform thin liquid in consistency. As this liquefying stage is approached, and about 20 minutes before the mass is thoroughly molten for the pouring, 16 oz. of

*6506 Kenwood Avenue, Chicago. Formerly superintendent of electric furnaces, United States High-Speed Steel & Tool Corporation, Albany, N. Y.



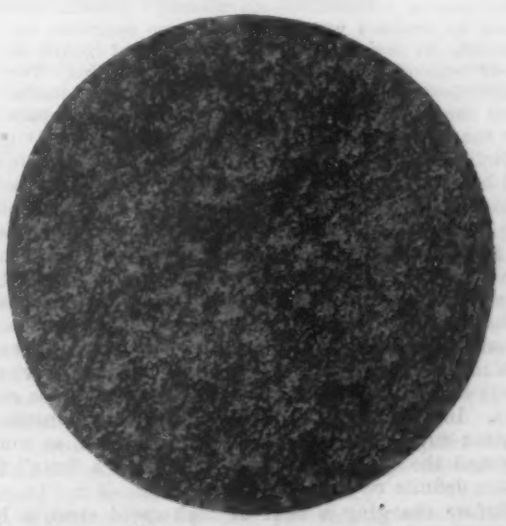


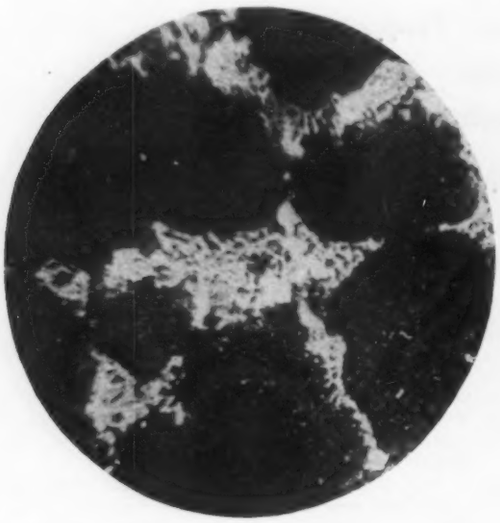
Fig. 1—Photomicrograph of Rolled High-Speed Steel in Annealed Condition, Longitudinal Section. Magnification 100 diameters. Extreme case of fibrous or "woody" structure. Fig. 2 (right) Photomicrograph of cast high-speed steel tool in annealed condition, furnace cooled, magnification 100 diameters, showing cellular structure or carbide envelopes

ferrotitanium is added. This time interval should be such after the addition of this titanium, that the titanium may have just sufficient time for thoroughly dissolving throughout the metal. This example is in no wise to be held as limiting the invention. The invention is not limited to any particular composition but has as its essential feature the production of a melt of such a character that the material can be directly cast.

The various ingredients incorporated with the iron may be considered to have various functions in improving the material. In this connection, the alloy substances selected for the particular charactor of tool may be pure or in some combination as with iron. It is desirable that none of the ingredients have deleterious quantities of substances, as sulphur or phosphorus. The less of these volatile impurities the quicker the purification takes effect.

The SAM metal may be considered the regular trade alloy on the market, including iron, manganese, aluminum and silicon. The use of this scavenging alloy may be described as a de-oxidizer in the melt herein, in which it may be further assisted by the added manganese in the ferromanganese while the titanium also has a purification function in assisting in the production of blow-hole free casts as in the driving off of nitrogen. The purification, therefore, as conducted hereunder, eliminates gas from the melt in the production of the uniform internal structure of the cast.

Molds, as for instance sand molds, are provided of the contour for the finished product. These molds may be provided with chills, as found desirable, especially for assisting in such uniformity of cooling as may best minimize internal stresses in casting. The high speed tool steel melt is poured directly into molds, and the castings therefrom, on cooling, are at once in the finished form for high-speed tools.



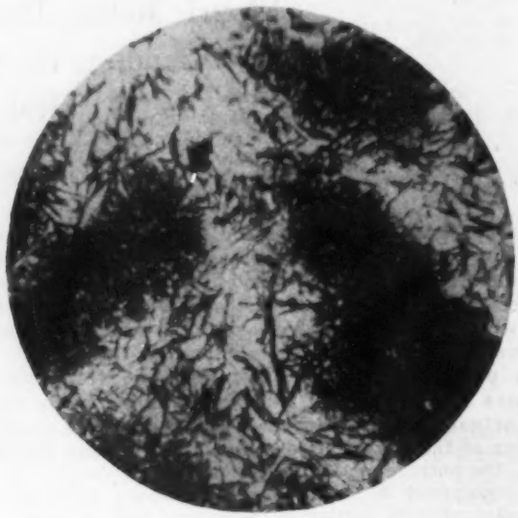


Fig. 3—Photomicrograph of Cast High-Speed Steel Tool. Same specimen as Fig. 2, but magnified 500 dia. Shows up double carbides (white). Fig. 4 (Right) Photomicrograph of cast high-speed steel tool. Annealed and furnace cooled, then quenched in a special medium from a high temperature. The structure is martensitic (dark) and austenitic (white) with unabsorbed double carbide eutectic

Similar to all high-grade steels, the selection of good basic materials is essential for excellent products. In this particular process the best commodities available were purchased. This has reference not only to metals and alloys, but also to the refractories and other supplies used. While analysis is an important factor in the selection of materials, the dominant factor should be their metallurgical characteristics which is partially gained by practical experience. In plants where there is no technical department it is a good plan to purchase brands of raw materials, so-called, from reputable concerns. In all cases care should be taken to insure a constant supply of the same grade material, as much time and thought are given to obtaining a "mix" for certain definite results.

Before charging a heat of high-speed steel, a hot furnace is required, the ideal condition being to attain this heat from the tapping out of a previous heat. However, a hot furnace is also secured by preheating with electricity, oil, gas, or other means. With a hot furnace the melting down time is reduced to a minimum and the metal and also the first slag contain less oxides than when starting with a cold furnace. Extreme care is taken by those making quality steel to see that only clean scrap is charged. It was the practice at the plant with which the writer was identified to rumble all scrap which had accumulated rust or foreign matter. This is one of the reasons why the heats melted "dead" and usually under a reducing slag without the addition of reducing agents.

Proportioning the Initial Charge

It is desirable that the initial charge be so proportioned that the preliminary carbon, silicon, manganese and vanadium contents are lower than the low limits of the specifications, while the chrome and tungsten should be well within the limits. Some opinions for this practice are given:

Carbon in the course of furnace operations can easily, through minor accidents such as electrode breakage or other causes, be increased beyond the desired limits (which is apparent only after the preliminary analysis has been made) and that means a delay caused through necessary additions of both Swedish iron and alloys required to lower the carbon within the specification. On the other hand, if the carbon is lower than the specification, it is an easy matter to adjust this element by the addition of broken electrodes or other means.

Silicon content should be as low as possible in the original charge, for this will permit the use of the maximum amount of ferrosilicon at the time of deoxidation.

Manganese and vanadium are desired in small percentages in the original charge. It is preferable to make all additions of these commodities in the form of ferroalloys after the preliminary analysis, when a good reducing slag is obtained and when the temperature of the bath is raised considerably above the pouring temperature. This not only decreases the alloy losses but also permits these alloys to have their full effect as deoxidizing mediums in the steel.

Ferrochromium is usually mixed with the ferrotungsten and added at the same time. It is believed by some operators that even the mechanical mixing of alloys lowers the solubility point of each alloy and this appears to be true in practice as the chrome-tungsten mix seemingly goes into solution in the metal quicker than either alloys added separately. Ferrotungsten should be added with the original scrap charge and placed almost central near the top of the charge, but being covered with a thin layer of iron or scrap to prevent the oxidation and subsequent

(*Continued on page* 1755)

New Source of High-Grade Coking Coal

Discovery Calculated to Make Available Large Reserves of Low Ash Coal from Practically Every Coking Coal District

BY H. M. CHANCE*

PRACTICALLY every coking coal district contains large quantities of coking coal of higher grade than any heretofore available for making low ash metallurgical coke. This high-grade coal contains less than 5 per cent ash, frequently less than 4 per cent ash, and in some cases possibly less than 3 per cent ash. It is not phenomenally low in sulphur, but will often contain a smaller percentage of sulphur than coals now used for making metallurgical coke. Its low ash makes a lower percentage of phosphorous probable.

This high-grade low ash coal exists in coal-beds of good, bad and indifferent quality, scattered through the coal in masses ¼ in., ½ in., ¾ in., 1 in. or 2, 3 or 4 in. in diameter. There are no visible lines of demarcation separating these masses of pure coal from the impure coal.

Many coalbeds normally furnishing coal averaging, say, 10 to 14 per cent ash, which by the complete removal of slate, fireclay, etc., cannot be reduced below 8 or 10 per cent ash, consist of a mixture of perhaps 50 per cent of coal averaging less than 5 per cent ash and 50 per cent of coal averaging 11 to 15 per cent ash.

Coalbeds normally furnishing coal having 8 to 10 per cent ash, which by the removal of slate, fireclay, etc., can be reduced to about 6 or 7 per cent ash, consist of a mixture of perhaps 50 per cent of coal averaging less than 4 per cent ash and 50 per cent of coal averaging 8 or 10 per cent ash.

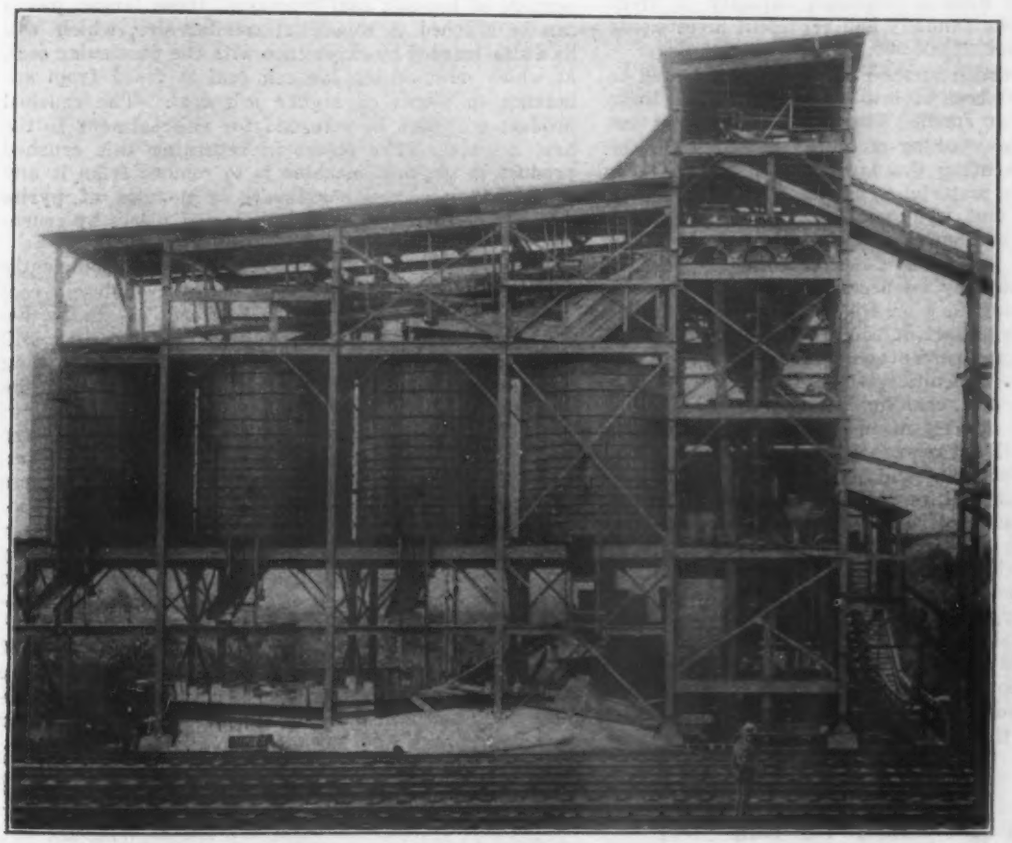
These examples serve to illustrate the important fact already stated, that coal is not a homogeneous substance, that the ash is almost always scattered throught it irregularly, and consequently that nearly all coalbeds producing merchantable coal contain an important and material percentage of low-ash coal.

Fortunately the specific gravity of each piece of coal depends upon the quantity of ash present in that piece, and this difference in specific gravity furnishes a ready means for separating the low-ash coal from that of higher ash content. The specific gravity increases about 0.01 for each per cent of ash present in the coal. Thus if coal with 3 per cent ash has a specific gravity of 1.35, the same coal with 4 per cent ash will have a specific gravity of about 1.36; with 5 per cent ash, 1.37; with 6 per cent, 1.38; with 8 per cent, 1.40; with 13 per cent, 1.45, and so on.

Hence, if a separation be made by a "float and sink" method by introducing the coal into a liquid of the desired specific gravity, as for example 1.38, all the coal having a specific gravity less than 1.38 will float and all the coal having a specific gravity greater than 1.38 will sink, and an exact separation will thus be made, dividing the coal into two definite grades, the low ash grade having less than 6 per cent ash.

Chemical solutions or high gravity liquids could be used for making such a separation experimentally, but could not be used commercially.

Fortunately the sand flotation process supplies a liquid of any desired specific gravity by which such separations are easily made. This process consists in



A Plant for the Sand Flotation Method of Separating Low Ash from High Ash Coal Would Doubtless Be Similar to a Plant Using the Same Process for Removing Slate, Rock and Other Impurities from Anthracite Coal. The anthracite washery here shown is at Winton, six miles from Scranton. It has one 15-ft. separating cone, whereas the differential separation required under the author's scheme would call for two

*H. M. Chance & Co., consulting mining engineers, Philadelphia.

the production of a heavy gravity liquid, termed a "fluid mass," by agitating a definite mixture of any suitable comminuted solid, such as sand, and water, the sand being kept in suspension in the water by suitable means for providing agitation and the mix readily maintained at any desired specific gravity. The specific gravity is under close control and can be varied accurately at will.

This process was introduced in the anthracite districts of Pennsylvania by the building of a plant two years ago. There are now six plants in daily operation and another shortly to be completed. These seven plants are owned by seven different companies, are widely separated and no two of them are treating coal of exactly the same kind. The process is used not to make differential separation of coal into two or more grades, but to prepare the coal for market by the removal of slate, rock, pyrite, and heavy bony coal, one machine doing the work of a large number of jigs, spirals and other slate removers. At these plants the coal is fed unsized (from egg to No. 4 buckwheat) into the separating fluid mass and the floated coal is sized for market after separation of the impurities has been effected.

These plants have a combined capacity to treat over 1,000,000 tons annually and represent investments aggregating about $1,000,000.

The sand flotation method is especially adapted to the flotation of pieces of low-ash coal, whether these pieces be large or small. Therefore, in carrying out the process in the washing of bituminous coals for the purpose of separating the low-ash coal as an especially high grade material, crushing should be reduced to a minimum, that is, in many cases the separation should be made without crushing the coal smaller than 3 or 4-in. size. In other cases crushing to perhaps 1½ or 2-in. size may be necessary, but usually and ordinarily crushing to 3 or 4-in. size will be sufficient to separate a large part of the low-ash coal from coal containing a larger percentage of ash.

To avoid the difficulties which follow the wetting of the very fine coal, coal smaller than ⅛-in. mesh or perhaps smaller than ¼-in. mesh can be screened out and ordinarily will not require washing, because in many cases this fine material will not contain an excessive percentage of ash and, owing to the fact that the coal has not been finely crushed, the percentage of this fine material will be relatively small. This dry material usually can be added to the washed coal without appreciably raising the ash percentage in the finished product. If, however, this finer material does carry a large percentage of ash, it should be disposed of otherwise, because it would not then be permissible to add it to the high grade low-ash washed coal.

We shall assume that the machine is fed with run of mines coal, the larger lumps of which have been crushed to 3 or 4-in. size, and material smaller than ⅛ or ¼ in. has been removed prior to the coal's being fed into the machine. The separating fluid mass in the machine will be kept at a specific gravity high enough to float all of the coal. good, bad and indifferent, but low enough to permit all of the slate, pyrite and rock to sink, thus effecting a preliminary cleaning of the coal by the removal of these heavy impurities.

The coal floating in this first machine (or in the first compartment of a two-compartment machine) will overflow into a second machine (or into the second compartment) in which the specific gravity will be just sufficient to float the grade of low-ash product which it is desired to separate,and to permit all of the heavier coal to sink, thus effecting a differential separation, dividing the coal into two products, the first a very low-ash product and the second a higher ash product; and this separation has been accomplished without fine crushing of the coal.

In many cases it may be desirable to utilize the higher ash product directly as a steam fuel, or to market it as such, but if the larger lumps of this higher ash coal contain low-ash coal which can be separated by crushing, and if it be desired to increase the percentage of low-ash coal recovered, these larger pieces can be crushed to somewhat smaller size, which will be a size, learned by experience with the particular coal, at which most of the low-ash coal is freed from adherence to pieces of higher ash coal. The crushed product will then be returned for re-treatment to the first machine. The object in returning this crushed product to the first machine is to remove from it any pieces of slate, rock, or layers or nodules of pyrite which have been freed from the larger pieces by crushing to smaller size.

The process carried out in this way is sufficiently simple and will eliminate most of the troubles in coal washing plants caused by the fine coal or sludge, because very little sludge will be made and but little will be permitted to enter the machine. The separating fluid mass produces practically no attrition upon the coal and the only sludge producing agent in the plant is the fine screen over which the coal is passed for the removal of the sand, after the coal leaves the separator, and this screen, fine enough to permit the sand to pass but not fine enough to permit coal to pass, produces a very small percentage of sludge. Whatever sludge is produced, and that which the preliminary screens fail to remove, will of course be recovered and the water clarified for re-use by methods usually employed for this purpose.

The adaption of the process to the treatment of bituminous coals promises to be of especial value to the iron and steel industries in supplying for blast furnace operation a means of producing coke that is purer and better than any heretofore available.

Titanium and Silicon for Rail Steel

An investigation of some of the properties of steel rails deoxidized by the addition of titanium and silicon has been carried out by the Bureau of Standards. The tests showed that the steel treated with titanium was sounder and more homogeneous than the silicon treated steel, there being much less evidence of segregation in sulphur prints of the titanium treated steel and practically no streaks of impurities after etching. The decreased segregation brought about by the titanium treatment resulted in greater toughness and somewhat greater uniformity of mechanical properties in the portion of the rail from the top of the ingot. At the bottom end of the rail, however, the titanium treatment did not improve the steel appreciably more than the silicon treatment did. The greatest value of titanium treatment lies in its control of segregation and the elimination of the hard and brittle portions which the first rails from the ingot sometimes contain.

These tests form a continuation of previous studies of the various processes of steel rail manufacture with a view to establishing the best practice for insuring sound rails. The work was carried out in cooperation with the Titanium Alloy Mfg. Co., the Illinois Steel Co., the Illinois Central Railroad, and the R. W. Hunt Co., and consisted of a survey for homogeneity, soundness, and uniformity of mechanical properties of sections from the top and bottom ends of the first rail of a series of heats, some of which were deoxidised with titanium and some with silicon.

The results are given and the tests described in Technologic Paper No. 241 of the bureau entitled "A Comparison of the Deoxidation Effects of Titanium and Silicon on the Properties of Rail Steel."

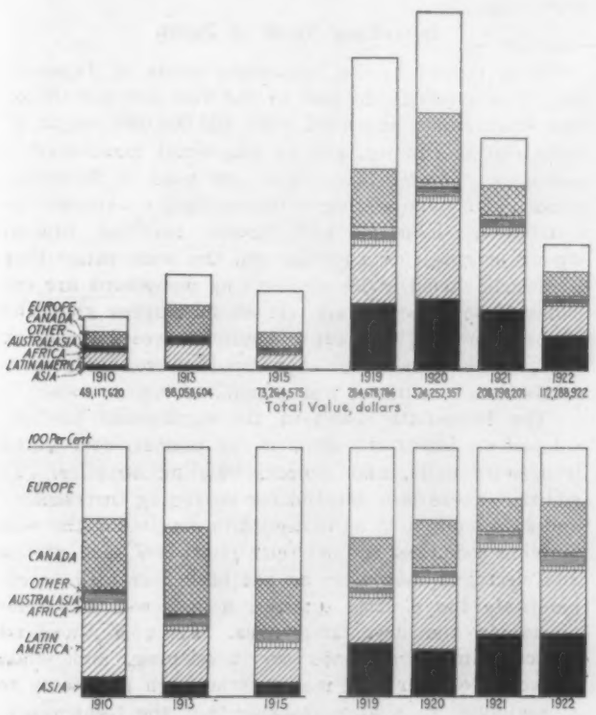
William Monroe White, chief engineer and manager, hydraulic department, Allis-Chalmers Mfg. Co., Milwaukee, gave an illustrated talk on hydro-electric development with special reference to the hydraulic equipment at a meeting on Wednesday evening, Dec. 19, of the Boston Society of Civil Engineers and members of the Boston Section A. S. M. E. and A. I. E. E., in Chipman Hall, Tremont Temple, Boston. Mr. White has had direct supervision of design and construction of many of the units now in operation on large hydro-electric developments throughout this country and Canada.

Japan's Probable Machinery Requirements

Needs of Reconstructing Damaged Areas and Industries Expected to Produce a Demand for Wide Variety of Equipment Over Long Period

BY W. H. RASTALL*

FIGURES collected by the Bureau of Foreign and Domestic Commerce show that for 1922 Japan ranked second among the markets of the world for American machinery, being exceeded only by Canada in taking more of our equipment than was absorbed by any other single country in the world. In



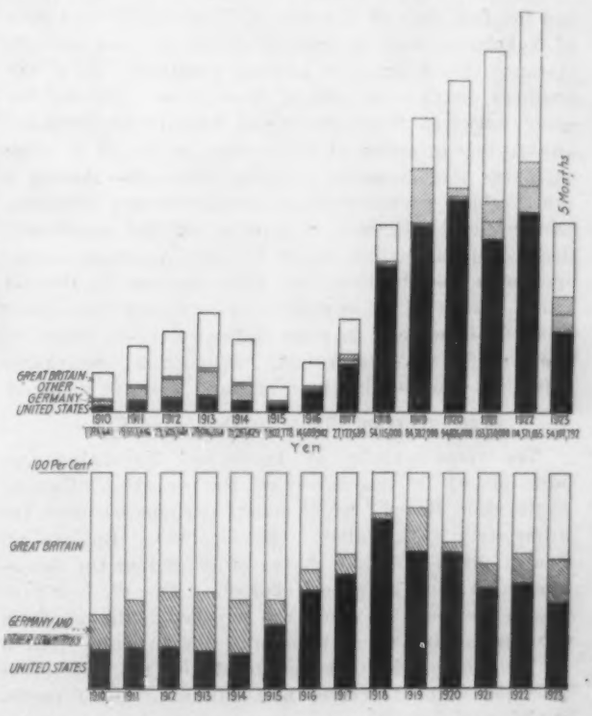
This Chart of the Distribution of American Machinery to Various Parts of the World Shows That, While the Percentage Sent to European Countries Is Diminishing, That Sent to Asia Is Rapidly Increasing. The upper half of the chart shows change in destination in money value and the lower half change in destination in percentages

1921 Japan ranked fourth, being outclassed by Canada, Mexico and Cuba. In 1919 Japan also ranked fourth. In 1913 she ranked eighth, and in 1910 tenth.

While the percentage of American machinery sent to European countries is diminishing, that sent to Asia is rapidly increasing, for while prior to 1915 these Asiatic countries absorbed say 5 per cent of our machinery exports, for 1921 and 1922 this volume had risen to more than 25 per cent, and this in spite of the fact that the volume of machinery exported in these later years was greatly in excess of the volume exported during the pre-war years. It is one of the fundamentals of sales policy that effort can be spent most effectively in markets that are expanding. So that apart from all other considerations, the Japanese market has proved itself probably to be the most important export market we have and one in which the fundamental conditions of expansion justify the expenditure of real sales effort as contrasted to the situation that has been experienced in Europe during recent years.

Since 1915 there has been a marked expansion in the machinery import trade of Japan and an especially gratifying increase in the volume of such imports from this country. Consider for a moment the position occupied by Germany and the volume of the machinery business secured by German interests during the various years. Although some of our newspapers and trade periodicals have at times published articles regarding the position of Germany in the machinery trade of the world, you will note that the German interests have never really been a really important factor in the Japanese market, although in certain pre-war years they did secure a larger volume of the machinery business than did American manufacturers.

Expressed as a percentage, the machinery trade in the United States shows an expansion from 18.2 per cent in 1910, or 16.7 per cent in 1914, to a maximum of 78.8 per cent in 1918, but has since



Since 1915 There Has Been a Marked Expansion in the Machinery Import Trade of Japan and an Especially Gratifying Increase in the Volume of Such Imports from the United States. The upper half of the chart shows change in origin of machinery imports by Japan, in money value (yen), and the lower half shows the change in origin expressed in percentages

been reduced to 50 per cent for 1922 and 42 per cent for the first five months of 1923. Conditions have now reached a point where the competition for this business lies between British and American manufacturers, and the two years following the war had a tendency to throttle these British exports, after which there was a revival, and by 1921 the British had worked up to 40 per cent of the total. For 1922 the showing was less

*The author is Chief of the Machinery Division, Bureau of Foreign and Domestic Commerce, Washington. This article is extracted from a paper he read at the recent Foreign Trade Convention in Cleveland.

favorable and for the five months of 1923 they were still behind the 1921 record. It is, of course, impossible to say whether any position of stability has been reached or whether there ever will be a real basis for comparison between the volume of this business secured by the British and our own manufacturers. All of this, however, provides a general picture of the situation existing in the Japanese market.

Japanese Exchange Fluctuations

In considering Japan as a market, a word should also be said regarding the exchange situation. During recent years a great deal has been said about the exchange fluctuations of Europe and, to a greater or less extent, in Latin America and elsewhere. It is recognized that these fluctuations seriously interfere with the conduct of normal business and in some instances the exchange problem alone has been sufficient to discourage American trade. However, with regard to Japan, in addition to being perhaps our best foreign market for machinery, it should be remembered that during the last decade exchange has probably fluctuated less than 5 per cent. Japan is one of the few countries that have managed to approximate the gold standard. This factor alone would justify sales effort in the Japanese market when such might not be the case elsewhere. All things considered, as a machinery market Japan ranks very high both on the score of the volume of business that has been done, the soundness of the fundamental conditions upon which this business is based, and the prospects for an important future trade.

Earlier speakers have referred to the earthquake and the fact that 40 per cent of Tokio and 80 per cent of Yokohama were completely wiped out, and in each instance this destruction affected practically all of the business districts in both of these cities. During the early weeks of September there were no business organizations in either of those cities, although in some instances the managers of these companies showed a remarkable resourcefulness in arranging new premises, and by early October a number of the machinery dealers in Japan had cabled to their American correspondents that business had been resumed in the old cities. Many of these companies have suffered severe financial losses and in some instances the members of their staffs have been lost, but with a remarkable spirit the situation has been met and business resumed.

Reconstruction Plans for Destroyed Cities

The reconstruction of Tokio and Yokohama has been placed in the hands of the so-called "Capital Restoration Board," which might perhaps be more appropriately translated "Metropolitan Restoration Board," as it will have charge of rebuilding the devastated area from Tokio to Yokohama. One of their first efforts has been to study the wrecked buildings from the engineering or architectural side in order that a building code might be developed and the new cities provided with structures best suited to resist earthquakes and fire.

It will be clear that this alone is a very large and difficult task. It should also be remembered that both Tokio and Yokohama had outgrown the original plans on which these cities were built. Tokio particularly was originally a city of old Japan, surrounded by walls, composed of small buildings of frame type, with tortuous and narrow streets, lacking in all of the conveniences of a modern city, and typically Oriental in every aspect, while during recent decades it has become a modern city with an abundance of Occidental business, and has felt the need for all manner of modern improvements. This need has been so keenly felt that American experts were invited to Japan before the earthquake to develop city plans for both Tokio and Yokohama providing for the growth of these cities. It was recognized that the redesigning of these cities would be a very difficult and extensive undertaking, notwithstanding which very substantial appropriations had been made and plans developed under which the cities would be gradually reconstructed over a long period of years. Now that so much of the area has been swept by fire and the buildings obliterated, it will be comparatively easy to arrange for the necessary improvements in these city plans, but it will be entirely impossible for the authorities in the metropolitan district to grant any permits for permanent buildings or other structures until the city plans have been worked out and provision made that streets are not blocked by these new permanent buildings. Provision must also be made for adequate sewerage, more adequate water supply, better transportation, and in a thousand directions the Metropolitan Reconstruction Board must perfect its plans before real reconstruction must begin.

Immediate Needs of Japan

With regard to the immediate needs of Japan it should be remembered that in the first five months of this year Japan imported over $27,000,000 worth of industrial machinery, and by industrial machinery is meant only those classes that are used in factories, mines and engineering constructions. Automotive equipment, electrical, and figures covering piping, wiring, engineering supplies and the wide range that is often included under engineering equipment are excluded from these totals. It would appear that the imports for 1923 will approximate or exceed those for 1922 and the market for such supplies, even under pre-earthquake conditions, was expanding.

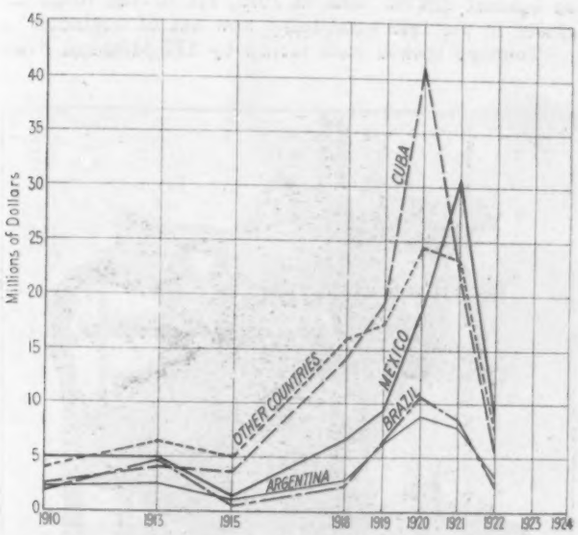
The immediate result of the earthquake has developed an important demand for lumber, corrugated iron, wire nails, and general building supplies. In addition, there is a demand for surveying instruments and such equipment as is needed in developing the new building code, and the new city plans and such wiring and electrical equipment as has been necessary to rehabilitate the electric systems, both power and telephone, in the devastated area. From a thousand sources similar demands are developing, and while financial consideration may restrict such purchases to a minimum, it is also probable that the total represented by items of this character will be important.

Looking beyond the present month to the period when permanent construction will be possible, the indications are that reinforced concrete buildings and steel buildings will be the approved types for the more important structures in the metropolitan area, and manufacturers of machinery suitable for such work may expect a demand in these directions. Manufacturers of pneumatic tools, air compressors, concrete mixers, hoists, rock crushers, etc., should take steps to strengthen their representation in this market as may be necessary to meet the situation arising as a result of this disaster. It is impossible to state exactly how much business will develop in any given direction, as altogether too many factors are involved in the problem. But every indication suggests that new Tokio will be vastly superior to old Tokio and new Yokohama likewise, and the contrast between these will probably be far more marked than the contrast between new San Francisco and old San Francisco, or new Baltimore and old Baltimore.

Another most important work will be in perfecting means of communication. Millions will probably be spent in the harbors of Yokohama and Tokio and manufacturers of dredges and construction machinery of the types used for such work may expect a certain demand to develop in this connection. Cranes and cargo-handling equipment will also be in demand.

There should also be a big improvement in highways and motor transportation, and although the Japanese authorities have not yet completed their investigations as to the types of paving most suited to the needs of the country and the Japanese Treasury, it seems probable that greatly improved roads will be built more or less throughout the metropolitan area. An important number of motor trucks has already been ordered for the reconstruction of these cities.

The industries demolished in the devastated area were of comparatively small importance, as Osaka was the great industrial area of Japan and it has been stated that the total number of employees in the factories of



Value of Exports of Machinery from the United States to Countries of Latin America, 1910 to 1922, Inclusive

Tokio were only about 5 per cent of those in the Osaka district. Less than 10 per cent of the cotton spindles of Japan were in the devastated area and many of these spindles were either not damaged or can be salvaged so that, although the cotton spinning industry is probably the most important in Japan, this disaster will not call for any important volume of new spindles. The same general remarks can apply in a number of other directions. The machinery losses of the industries that were in the devastated region are shown in the following statement issued by the Commercial Attaché of the Japanese Government in this country:

	Yen
Textile	44,000,000
Electrical, including telephone, telegraph	18,000,000
Electrical appliances	4,000,000
Automobile, bicycle	4,000,000
Surgical equipment	1,500,000
Rubber products	10,000,000
Printing	1,000,000
Glassware, enamels	2,500,000
Pencils	1,000,000
Brick	200,000
Safes	250,000
Galvanizing	450,000
Bolts, fittings	400,000
Rice	150,000
Sawmill	200,000
Celluloid	250,000

Government Bureau Offers Aid

The kinds and classes of machinery regularly imported in Japan are shown quite clearly in the customs returns published by that government, and it is to be expected that a reasonable demand for such equipment will continue indefinitely, and to a certain extent will be increased as the result of this disaster; but it should be emphasized that successful foreign trade depends, not upon a spasmodic effort following a disaster of this kind, but upon the application of consecutive and constructive salesmanship at all times. In the machinery industry, the average American factory exports perhaps 20 per cent of its production. The average English shop exports perhaps 60 per cent of its production and the prosperity of these companies depends in greater or less degree upon this export ratio. The Bureau of Foreign and Domestic Commerce will be very glad to cooperate in the solution of export problems arising, and going after such business.

Activities of New England Industries

The Bath Iron Works, Bath, Me., primarily a shipbuilding proposition, but for some time engaged in locomotive repair work, is now manufacturing magazine wood pulp grinders for the Great Northern Paper Co. The machines are designed for wood in four foot lengths, and are of heavy construction, each unit weighing 95,000 lb.

The American Steel & Wire Co., Worcester, Mass., is running full, some departments day and night, with more than 5000 on the payroll. The cable units, South Works, are the hardest pushed for deliveries. The Worcester, Clinton, Spencer and Palmer, Mass., works of the Wickwire Spencer Steel Corporation are either on full or double time. The C. F. Wright Steel & Wire Co. and the Worcester Wire Works, Inc., are building plant additions to care for increased business. The Osgood Bradley Car Co., the Morgan Construction Co. and the Curtis & Marble Machine Co., Worcester, are extremely busy. Otherwise business in Worcester's metal working industries is slowing down, as is usual at this time.

New England automobile manufacturers generally are not sharing in the prosperity enjoyed by Middle West makers. One manufacturer has just been forced into an unfavorable position through forced bankruptcy proceedings against its backer; the receiver of the Stanley Motor Carriage Co., Newton, Mass., has proposals acceptable to the principal creditors, which may result in an early reorganization of the company; the Stevens Duryea, Chicopee, Mass., plant recently was sold by receivers; the Northway Motors Co. is about to pass into new hands, having assumed financial difficulties.

The New England textile machinery business, which only a few months back was hard pressed for deliveries, has experienced a setback. The heater and radiator industries, on the other hand, are operating in full.

Increased Melt of Ohio Foundries

The Ohio State Foundrymen's Association, Cleveland, reports that operations of Ohio foundries for November were on a more satisfactory basis than in October. November figures indicate the industry operated at 70.29 per cent of normal or capacity, an increase of 2 per cent as compared with October. November, 1922, was on the basis of 64 per cent of normal. Stocks on hand show an increase of about 5 per cent. Stocks received declined 4 per cent.

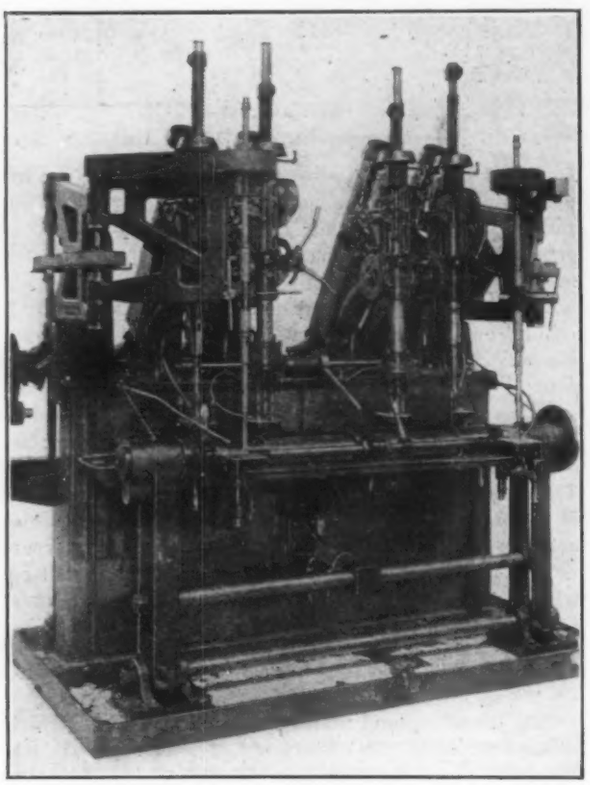
Non-ferrous operations show an increase of 5 per cent over October. During November the industry operated at exactly 60 per cent of capacity; October figure stood at 55 per cent. November justified the anticipations of non-ferrous operators expressed some weeks ago in that conditions were improving. Prospects in this department are reported as being encouraging.

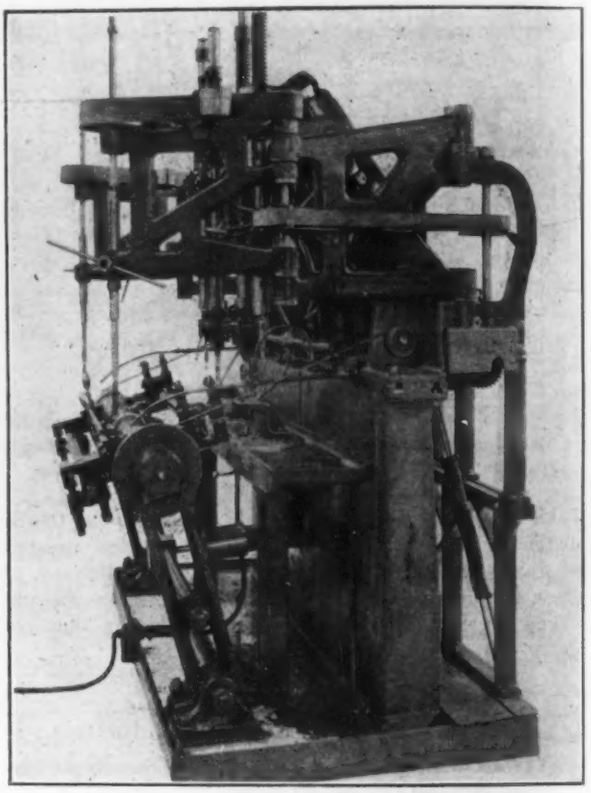
Organized by the city of Brussels and the Belgian Government, the Fifth Commercial and International Brussels Fair will be held from April 1 to 16, 1924. The Brussels Samples Fair is entirely devoted to industry and commerce and is not a commercial enterprise. Full particulars about regulations, advertising and applications may be obtained from the Executive Committee, 19 Grand Place, Brussels, or at the Belgian Consulate, 25 Madison Avenue, New York.

Special Machine for Axle Drilling

An increase from 20 to 40 an hour in the drilling and reaming of automobile front axles is claimed for the machine illustrated, which was developed by the Barnes Drill Co., Rockford, Ill. The increase in production is attributed largely to the employment of a turnover jig which permits of reaming simultaneously with the drilling and also reloading while the axle is being drilled.

The machine itself is a four-spindle, adjustable-head all geared gang drill, equipped with two radial heads added, as shown. The radial heads are of jointed construction so that they will swing into the reaming position without interfering with the main spindles which drill the king pin holes. While one axle is being drilled under the main spindles of the gang, using auxiliary heads for the spring pad holes, the king pin holes are reamed in the outer or upside-down position of the turnover jig. Thus the drill bushing is out of the way of the reamer. The finished axle is then removed and a new forging chucked in the jig, the reaming and reloading being accomplished during the drilling operation in the opposite position.





Special 24-In. Adjustable Head Gang Drill for Front Axle Drilling and Reaming. The radial heads at each end swing in to ream king pin holes of the drilled axle in one station of the jig, while the machine is drilling king pin holes and spring pad holes in another axle in the jig. The end view shows the jig in outer position ready to turn over

A foot pedal operating an air cylinder is used to push the jig to the outer position so that the jig will clear the table when turned over, the air cylinder then drawing the jig back to the working position. It is said to take less than 10 sec. to index the jig.

The jig has quick lateral adjustment to bring the bushing guides to the center of the boss on the axle forging, which has a slight variation because of shrinkage in the overall length of the forging. The outer spindles of the machine itself may be brought quickly to the center of the bushing by movement of the lever shown at the center of the gang.

The company's adjustable-head, all geared gang drills are so called because they have lateral spindle adjustment. The spindle at the left end is fixed, the other heads being adjustable by means of rack and pinion, giving a range in center distances from 17 in. between any two adjacent spindles to 80 in. between the two outside spindles on the 24-in. four-spindle machine. Each spindle has eight geared speeds and feeds.

Structural Steel Bookings Better in November

WASHINGTON, Dec. 21.—The Department of Commerce announces November sales of fabricated structural steel, based on figures received from the principal fabricators of the country. Total sales of 120,858 tons were reported for November by firms with a capacity of 223,472 tons per month, or 54 per cent of capacity. Shipments of firms reporting this item represented 65 per cent of capacity, as against 78 per cent in October.

A survey of the present capacity of the industry indicates that the capacity normally used for structural work is about 250,000 tons per month for 1923, the same as reported for 1922. Reports received from 170 identical firms show a capacity of 231,682 tons in 1923 as against 228,280 tons in 1922, six of the firms included in the 1922 total being now out of business.

Tonnage booked each month by 177 identical firms (of which six are now out of business), with a capacity for 1923 of 234,057 tons per month, is shown below, together with the per cent of shop capacity represented by these bookings. For comparative purposes the figures are also prorated to obtain an estimated total for the United States on a capacity of 250,000 tons per month. The percentage of shop capacity for the months of 1923 has been slightly changed by use of the revised 1923 capacity figures in the calculation.

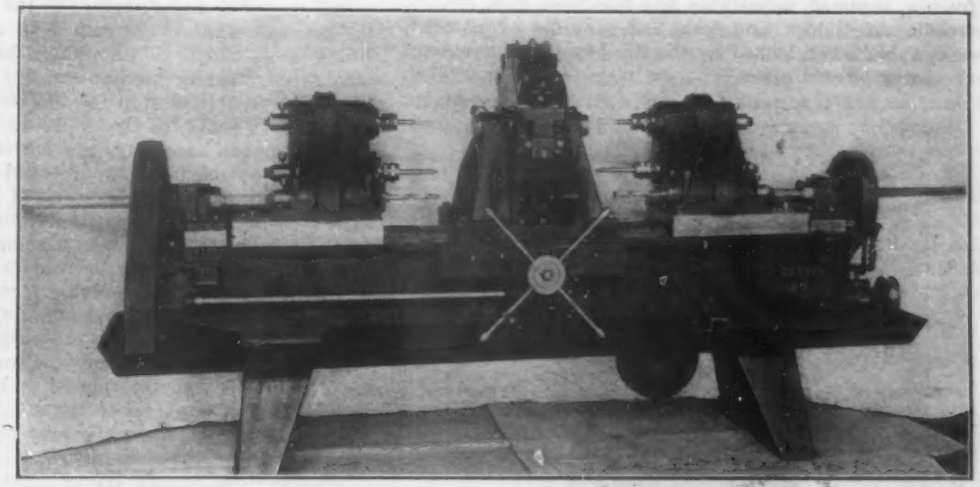
	Actual Tonnage Booked	Per Cent of Capacity	Computed Total Bookings
1922			
October	133,037	58	145,000
November	112,367	49	122,500
December	138,737	60	150,000
1923			
January	173,294	74	185,000
February	184,887	79	197,500
March	220,400	94	235,000
April	186,117	80	200,000
May	131,875	56	140,000
June	118,117	50	125,000
July	117,563	50	125,000
August	134,431*	58	145,000
September	121,096**	52	130,000
October	111,692***	48	120,000
November	120,858****	54	135,000

*Reported by 176 firms with a capacity of 232,857 tons.
**Reported by 174 firms with a capacity of 232,107 tons.
***Reported by 169 firms with a capacity of 231,257 tons.
****Reported by 153 firms with a capacity of 223,472 tons.

Three-Spindle Duplex Horizontal Drill

The three-spindle, duplex horizontal drilling machine illustrated, developed primarily for drilling, boring and reaming automobile steering knuckles but adaptable also to the machining of other parts, has been placed on the market by the Garvin Machine Co., New York.

The machine, which is designated as the No. 1-S, is of the company's standard design, having as added features the three spindles in each head and the squirrel-cage type of fixture. The work is held in this fixture and three different pieces are operated on at the same time, one piece being drilled with a ¾-in. drill, another piece bored to 27/32-in. size, and the third piece finished reamed to ⅞-in. The heads feed into the work automatically and are returned by the pilot wheel shown at the front of the machine. The fixture is then indexed to the next piece and the feed thrown in. The machine is said to finish a steering knuckle every 40 seconds.



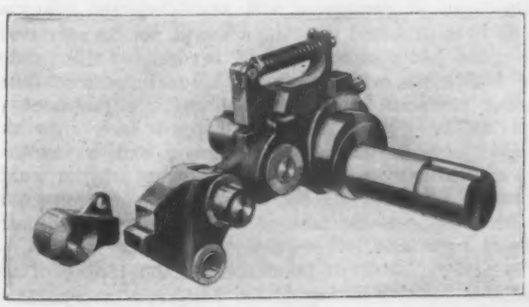
Machine for Drilling, Boring and Reaming Automobile Steering Knuckles. The three spindles in each head and the squirrel cage type of fixture are features. Each head is driven independently by a motor at the rear and heads feed into the work automatically. Three different pieces are operated on at the same time. One piece is finished every 40 sec.

Each head is driven independently by a 7½-hp. motor bolted to the rear of the bed of the machine, making a compact direct drive. The power is transmitted through spur gears to the main driving shaft in the heads. All gears are protected by guards, and the work is flooded by lubricant from the pump shown at the right hand in the illustration.

Stop Motion Device for Forging Machine

A new stop motion device called the rocker type drop lock has been adopted as a standard equipment for the new model bolt heading upsetting forging machines of the Ajax Mfg. Co., Cleveland.

The operation of a stop motion forging machine is somewhat similar to a press, in that the slides remain at rest until the hot stock is located in the impression in the stationary die and the machine is tripped. In such operator-controlled machines, the almost universal method of bringing the slides into action is by a hub clutch in a revolving gear or flywheel engaging direct into the end of the crankshaft, which is at rest. As this requires the sudden picking-up of the crankshaft to full speed there is usually a resultant shock, particularly evidenced when heavy parts are involved.



Stop Motion Mechanism of Ajax New Model Forging Machines

With the drop lock device illustrated the crankshaft with pitman attached is in idle rotation when the slides are at rest as with the old type drop lock, but the wrist pin end of the pitman is carried by an oscillating rocker fulcrumed at the bottom of the header slide instead of by reciprocating slide blocks, as formerly. While the machine is idle this rocker swings free under the drop lock. When the treadle is depressed the lock drops onto the upper surface of the rocker and rides on this surface until the rocker reaches its extreme back travel, where the lock falls into engagement. As this occurs just as the crankshaft passes over its back dead center, the velocity of the reciprocating and oscillating parts is practically zero when engaged and the slides are thrown into motion with a natural acceleration without shock, for as many strokes as desired. Upon removing the foot from the treadle, the lock is disengaged and the slides come to rest at their extreme back travel.

This device is similar in principle to the slide block type of drop lock, which it replaces. However, it is claimed to be a decided improvement over the old design, due to the extreme shortness of the lock, the increased engaging area and smooth action. Its relatively light weight eliminates the necessity of a counterweight and timing lock employed formerly. The new device is protected by patent granted recently to its inventor J. R. Blakeslee, president of the Ajax Mfg. Co.

Steel Furniture November Shipments

November shipments of steel-furniture stock goods, based on reports received from 22 manufacturers by the Department of Commerce, amounted to $1,339,425 against $1,365,600 in October and $1,204,310 in November, 1922. The totals for the first eleven months of 1923 and 1922 are $15,378,193 and $11,551,874, respectively.

Economy in the use of fuel is the subject of a meeting to be held at the Engineers' Club, Philadelphia, 1317 Spruce Street, Jan. 15. Sessions are scheduled for morning, afternoon and evening, and are expected to cover railroads, public utilities, manufacturing uses, metallurgical uses and domestic uses. A complete program will shortly be available and may be obtained by applying to Charles E. Billin, secretary.

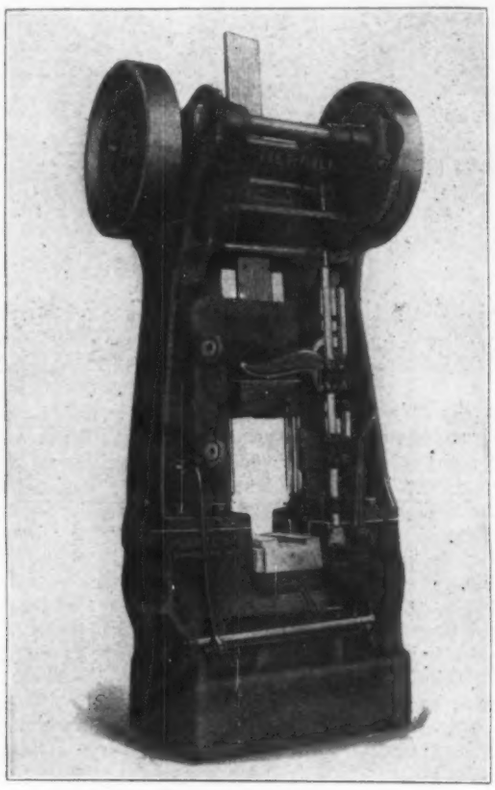
The members of the Electric Hoist Manufacturers' Association report a decrease of 13.58 per cent in the number of hoists ordered in November as compared with the previous month, and a decrease of 11.43 per cent in the value of hoists ordered. Shipments for November decreased 5.35 per cent as compared with October.

NEW LINE OF DROP HAMMERS

Adjustment for Uneven Wear of Roll Bearings—Inserted Ram Guides—Other Features

A line of board drop hammers incorporating improved features, which are said to overcome difficulties heretofore tolerated as necessary evils in the drop forge shop, has been brought out by the Merrill Brothers, Maspeth, N. Y. The machines are available in sizes ranging from 600 to 5000 lb. falling weight.

Exclusive features claimed include adjustment to compensate for uneven wear of roll bearings, absolutely straight friction bar, rigid and non-adjustable upright frames, inserted, adjustable and reversible ram guides, treadle safety lock, and front and back die adjustment, immovable when locked by the die key. The hammers are being offered after exacting tests in actual service.



Inserted Ram Guides Permit of Taking Up Wear On the V's as it Develops. Ease of removing and replaning the inserted guides is a feature

In the lifting mechanism, the arrangement of sliding boxes used for 25 years in the previous design has been improved by the substitution of roll rockers. Direct horizontal pressure against the board is said to be maintained as with the sliding boxes, with the advantage of better support for the roll pressure and belt pull. The hammer may be operated with the belts driving from the front or from the rear or one from the front and one from the rear.

To maintain parallelism of the rolls there has been incorporated a compensating eccentric in one of the eccentric sleeves, the adjustment of which may be made conveniently without removing any of the lifter parts. If desired the hammer may be quickly arranged to use thick or thin lifting boards, by changing the roll eccentric bushing. The eccentric construction is such that when the friction bar falls the rolls are practically locked, an arrangement intended to permit the use of a very light friction bar, roll the board more nearly straight and prevent excessive wear near the point of pick-up.

The main roll bearings are ring oiled from four large and accessible oil pockets, which hold about a four weeks' supply. Sliding bearings, where the pressure is high but the movements small, are lubricated by means of oil-soaked felt pads.

Friction rods on drop hammers are usually made with one and sometimes two offsets at the upper end, a construction which in connection with the kickback from the roll releasing lever is said to render them susceptible to crystallization and breakage. The new hammers have a straight friction bar with an eye at the upper end for attachment to the eccentric lever. The roll releasing lever is designed to lift the friction bar to its seat without shock, permitting the hammer to run practically at as high a speed as the lifting board will stand. It is constructed so that the leverage shortens as the friction bar is raised, which is accomplished by means of a rolling contact on a non-metallic surface on the ram, giving, it is claimed, a greater friction roll opening than with a plain lever operating on a ram pin. The under surface of the lever being curved, the pressure against the ram is in a vertical direction, which is intended to eliminate the kickback on the whole roll releasing mechanism.

A unique bottom stop for the rod has been incorporated. Both seats for the upper and lower positions of rod are in one assembly, the entire mechanism being removable by releasing two vertical guide bolts. Wear due to the drag of the lower end of the rod when being raised from its lower position is taken by the front of the stop plate. The base casting is protected from wear and the plate may be removed and redressed or renewed. Suitable non-metallic plates are placed under the stop seats to take the shock of the falling rod.

The clamp for holding the ram suspended is conveniently adjustable in conjunction with the special treadle. The clamps are placed under the rolls and are full floating to conform to the alinement of the board. The board clamp assembly may be removed without removing any parts of the lifter.

The upright frames are of steel castings of I-beam section. The bearings on the base have been increased in all directions, as well as the depth and length of the upright guide in the anvil. The foot of the upright is tightly fitted on four sides to the top of the base, eliminating movement in any direction. Four hold-down bolts are used which, in combination with the lifter construction and tie rods at the top of the uprights, is intended to prevent rocking of the uprights on the base. Dirt clearance under the upright foot in the anvil has been provided, dirt and scale being removed without taking down the upright from the base. The clearance surfaces are pitched so that the dirt may find its way through an outlet at the side of base. The upright feet are deeply guided in the anvil, and the side thrust from breakdown work is taken in a manner intended to prevent failure at this point of either the upright or base.

Provision has been made for the convenient truing of the V's of the uprights when they become too badly worn for accurate forging. Adjustable and reversible ram guides are fitted to the steel upright frames and a planer large enough for truing the V's of the ram may be used for planing the guides, as the adjustable pieces are not longer than about 5 ft. on the largest hammers and are plain, straight and square sections. Because of the ease of removing and replaning the inserted guides, it is expected that the V's will not be permitted to become badly worn. Being reversible, the guides have double V's, which prolong the usefulness of these wearing surfaces. The inserted guide adjustment is simple. The guides may be dropped back into the uprights to permit the ram to be removed, as well as take up for uneven wear at the bottom of the guide and ram. By adjusting both the bottom and top guide adjusting wedges, the face of the ram may be squared up from right and left with the face of the shoe.

To prevent mishaps from accidental tripping of the treadle, a positive acting device has been incorporated, whereby the treadle cannot be tripped except by placing the foot on a pad provided. This pad, which is about 6 in. square, may be adjusted from right to left to suit the convenience of the operator.

Die adjustment from front to back is accomplished by means of a double taper insert in the top of the forged steel shoe opposite the die key. This construction is said to be positive, and the die cannot get loose without the die keys coming out.

Pulverized Coal in Open-Hearth Work

Comparison with Other Fuels—Its Disadvantages in Open-Hearth Operation—Data on Steel Production with Pulverized Coal and Producer Gas

BY R. H. LOWNDES*

IT has been well said that energy is the foundation of industry; therefore it behooves those interested in industry to study closely all possible phases of the development of energy. There are at most but few sources of energy, three of which are direct and a small number indirect. Further, the three so-called direct sources may all be attributed to but one source. These three are wind, water and heat.

Industrial heat energy is obtained by the burning of fuel, which is the bringing together of any two substances that will unite chemically with evolution of heat. Oxygen, one of the most plentiful of substances, is very active chemically, and carbon, the most abundant of all substances, has a strong affinity for oxygen. It is most reasonable, therefore, that these two elements should constitute our chief sources of heat.

In the burning of coal with air lies the chief source of our heat-derived energy. Our principal effort is to obtain the maximum heat by the best methods of burning. The purpose for which the heat derived is to be used is the principal factor in determining the choice of the method of burning.

Basis of Comparison of Pulverized Coal with Other Fuels

It is our purpose to discuss specifically the burning of coal in the pulverized state for the production of steel in the open-hearth furnace, and to determine, if possible, whether or not this application is a good one. This can of course be judged only on a basis of comparison with the use of other fuels and other methods of burning. This comparison involves the study of three factors:

1—The cost of the fuel burned, based preferably on the tons of steel output to care for the quantity of steel produced.

2—The quality of the steel produced.

3—The consequent cost of repairs and upkeep of the furnace and its accessories.

In considering the first of these factors it is necessary to take into account the cost of coal per ton; the cost of milling per ton and the possible losses consequent upon this milling. By milling is meant the crushing, drying, and pulverizing of the coal and its delivery to the burners along with the necessary air.

Cost of the coal is always known. Cost of milling includes several costs which are readily determined. First is cost of installation of a coal mill, on which a reasonable rate of return must be figured. Thus if the coal mill cost, say $25,000, a return of 6 per cent would mean $1,500 per year. This, divided by the tons of coal milled, should be added to the cost of fuel per ton. Also a reasonable sinking fund, reckoned as a percentage of the investment, should be set aside for depreciation and obsolescence; and this, too, should be added to the cost of the fuel. Insurance should likewise be reckoned as an annual expense and charged to the cost of the fuel. Next is the cost of power to drive the mill, with its crushers, driers, pulverizers, elevators and conveyors, air compressors and fans; the labor cost, and cost of repairs and upkeep, oil, waste, etc.

Possible losses in fuel value in milling are more difficult to reckon. They are due principally to coal burned to dry the fuel in the drier; loss in volatile combustible driven off in the process of drying; loss in leakage of coal dust; loss in occasional emptying of bins to prevent packing or spontaneous combustion; loss in fires, which occasionally take place.

The losses enumerated are all small, and for a broad discussion need be noted only, and then perhaps discounted. The coal burned to dry the fuel may be neglected, since this additional amount is automatically consumed in any method in first driving off the moisture before the available heat in the fuel becomes obtainable. The loss in volatile is apparently quite small. The best available data on this particular point show an average loss of something less than 1 per cent. It seems to be admitted that here is a small loss, but not enough to cause any concern. H. R. Collins in 1918 stated that driers were manufactured which were able to eliminate moisture without distilling any of the volatile combustible matter in the coal. He then described the modern drier, employing temperatures not greater than 300 deg. Fahr., and stated that the volatile combustible matter was not likely to be driven off until the temperature rose above 400 deg. Fahr.

Loss in coal-dust leakage is purely mechanical, and the latest mills have almost entirely stopped this leakage. Until they did so, however, this loss was quite heavy. The loss in having to empty bins is also minimized by increased knowledge of the quantities of fuel necessary in any specific operation, and the consequent prevention of large accumulations in the bins. This same control also minimizes the loss due to fires, and in the modern mill they are almost unknown.

Assuming, then, that coal can be pulverized at a cost of something like 65c. per ton (J. W. Fuller estimates that coal can be pulverized and delivered to the burners for 35c. per ton, as compared to 60c. per ton for gas producers), with coal costing, say, $6.50 per ton, the milling adds about 10 per cent to the cost of the fuel. We have a right to expect this to be returned by virtue of the much-improved burning; and indeed, so far as the heat obtained is concerned, this additional expense is more than justified. This loss is less expensive than the B.t.u. loss in the gas producer. With good burners and proper air adjustment, what may be termed the carburetion of the coal dust is so good that combustion is excellent.

Analyses of the products of combustion show the percentage of CO_2 to be very high, in some cases as high as 15.8 per cent. H. R. Collins (Fuller Engineering Co.) reports tests where this value reached 17 per cent. The excess air necessary is small, only about 18 per cent, and at the very high temperatures reached the sulphur is also largely burned and carried off up the stack as SO_2.

In considering the quality of the steel produced, the following items enter: the control of the flame, not only chemically but also as to intensity, direction, shape, and velocity; the kind of coal used; its constituents other than carbon; the kind and amount of so-called impurities, moisture, volatiles, sulphur, and ash being the chief items. Each of these may affect the steel.

The flame may be directed, lengthened, shortened, made oxidizing or reducing as desired, and the temperature may be kept remarkably constant at any desired point within quite wide ranges.

Disadvantages of Pulverized Coal in Open-Hearth Operation

All of this leads to the belief that pulverized coal is indeed an ideal fuel. For some uses this may be so, but we have not yet considered the third factor in our discussion of open-hearth operation, namely, the cost of repairs and upkeep of the furnace and its accessories.

*Chief engineer Atlantic Steel Co., Atlanta. Abstract of paper presented at Chattanooga regional meeting of the American Society of Mechanical Engineers, Oct. 24.

It has been our experience at the Atlantic Steel Co. that herein lie the greatest difficulties. We have found the condition of our coal-fired furnace after 100 heats is worse than the condition of a similar furnace, oil-fired, after 287 heats. The gas-fired furnaces suffer even less. In round numbers, we have obtained about three times as many heats from our other furnaces as from the coal-fired furnace, where the refractories cut away, the slag pockets fill faster, and the checkers become choked.

It appears that the excess air carried along with the sweeping flame at the terrific temperature attained so rapidly will attack and cut the refractories more than it does with either the oil or the gas flame. Compared with the gas flame this is not so surprising, but when compared with the oil flame we must seek more closely for a cause of the difference. There are some who attribute the possible cause of the rapid cutting of the refractories with the coal flame to the presence of incandescent ash particles impinging at high temperature in conjunction with the highly heated excess air. This ash, it is supposed, may start some sort of slagging action, which lays the surface of the brick more open to the attack of the oxygen. Certain it is that the ash has a pronounced effect on the slag of the bath.

But the chief source of annoyance and expense lies in the deposit of ash as slag in the slag pockets and in the checkers. This takes place rapidly, and the toughness of the deposited slag is pronounced. We found that a high stack velocity lessens this deposit materially; but this increase of stack velocity is obtained at the expense of several things. It calls for additional excess air to increase the volume of gases passing, so as to increase the velocity. This of course at once reduces the temperature of the flame, but at the same time it increases the cutting effect on the refractories.

To carry off this extra volume of flue gas necessitated our passing the gases from the checkers directly to the stack, cutting out the waste-heat boiler. This is of course another serious loss of heat energy. Attempts to use the waste-heat boiler reduced the flue-gas velocity so that the slag deposited rapidly, and the checkers became badly choked. This choking of the checkers further reduced the gas velocity, which caused a further drop in flame temperature, which in turn seemed to cause more sulphur to enter into combination in the steel.

Both the temperature and intensity, as well as the direction of the flame, had to be kept within certain limits to avoid sulphur troubles. It seems that the sulphur oxidizes and passes off as SO_2 at and above certain temperatures. This is doubly advantageous, as the sulphur is not only disposed of but it generates heat in burning. When the temperature falls below this critical value the sulphur prefers the iron to the oxygen and goes into the steel, combining in more than one compound.

So, to get rid of the sulphur the flame intensity should be high, the flame should not be depressed—that is, it should be directed above the bath, and the excess air must be adjusted within narrow limits. Too little excess air and the sulphur is not oxidized; too much, and the temperature drops, and again the sulphur is not oxidized. When these several adjustments are about right to effect a maximum riddance of sulphur, the velocity of the gases is reduced to a point where the refractories cut and the slag deposits heavily.

Cutting off the waste-heat boiler and increasing the excess air increases the flue-gas velocity and lessens the ash and slag deposit; but the refractories cut faster, the temperature of the flame drops, more sulphur enters the bath, and the use of the boiler is entirely lost.

The experience here recounted ran over a period of about seven years, 1916 to 1922, inclusive. These years were seriously affected by war conditions, both high and low peaks being reached in that time. It has been difficult, therefore, to compile any very fair set of data. But the conspicuous and interesting fact is that both study and experience have clearly shown us that the major objections to the use of pulverized coal in the open-hearth furnace lie not in the preparation nor in the burning of the coal, but almost entirely in that part of the work which coal-burning literature touches on so little or not at all, namely, the consequent clean-up, upkeep and repairs.

There is but one way to evaluate pulverized coal correctly as a fuel for the open-hearth furnace, and that is to watch the industry for a decade or two longer. With the ever-increasing improvements for taking care of difficulties as they present themselves, this type of fuel may come to be more and more used in open-hearth work. But at present the Atlantic Steel Co. has just discarded its coal-fired furnace, because of the higher cost of producing steel by this means.

Comparative Costs of Open-Hearth Operation with Pulverized Coal and Producer Gas

In the table will be found figures taken from data accumulated during 1922. This year was chosen as being most nearly representative, since prices of commodities and labor, and of production in general, were then somewhere about midway between the high peak of the war and the low peak of the intervening depression. These figures show some of the actual costs, and these in turn show why this method of open-hearth operation was abandoned by the Atlantic Steel Co.

Steel Production in Open-Hearth Furnaces Burning Pulverized Coal—Atlantic Steel Co., 1922

Date	Fuel			Steel			Repairs	
Month	Per ton coal	Per ton coal for milling	Pounds coal per ton steel	Tons steel output	Heats per furnace	Sulphur in steel per cent	Per month	Per ton steel
Apr.	$4.83	$0.67	668	2271	49	....	$343	$0.15
May	4.95	0.60	740	2580	52	....	771	0.30
June	5.23	0.68	1170	412	9	....	....	7.28
July	5.40	0.61	580	2453	50	....	....	1.98
Aug.	6.84	0.60	660	2124	44	....	1,247	0.59
Sept.	7.22	0.82	630	2048	42	....	1,713	0.83
Oct.	7.38	0.56	638	1768	37	....	3,526	2.00
Nov.	7.49	0.52	666	2383	47	....	3,468	1.46
Dec.	8.27	0.58	664	2370	47	....	1,261	0.53
Avg.	6.40	0.62	636*	2068	42	0.065	1,761	1.68
Do., for gas†	6.40	0.60	548	2016	39	0.045	1,361	0.96

Tennessee coal used, averaging 36 per cent volatile, 53 per cent fixed carbon, 3½ per cent moisture, 6 per cent ash, and 1½ per cent sulphur.

Dried at an average temperature of 200 deg. Fahr., to about 1 per cent moisture.

Average pulverization showing 98 per cent passing 100-mesh screen and 81½ per cent passing 200-mesh screen.

*This figure obtained by dividing total coal consumption by total steel output.

†Average for the same months for two gas-fired furnaces.

It is apparent at a glance from the figures in the table that the gas-made steel is both better and cheaper. It is also apparent that the chief objections to the use of pulverized coal lie in the difficulties engendered in the necessity of running the ash through as a part of the products of combustion.

A report on "Pulverized-Coal Systems in America," compiled by Leonard C. Harvey, and published in London in 1919, shows that the Atlantic Steel Co. is not alone in its findings as to the life of checkers. Under the heading "Opinions of Users" occurs the following statement:

> Have found the average life of checkers for various fuels in the open-hearth furnace to be—
> For natural gas.....1000 heats
> For producer gas ..... 350 to 500 heats
> For oil ..... 350 to 500 heats
> For pulverized coal..... 225 to 250 heats

Use of Pulverized Coal in Soaking Pits

The Atlantic Steel Co. is continuing its use of pulverized coal in the soaking pits, where the results are far more satisfactory than they were in the furnace, but are not so good as with producer gas. The slag and ash deposit of course takes place in the combustion chamber, in the soaking pit proper, and at the base of the stack. But this deposit is more readily removed and need never be allowed to accumulate sufficiently to choke the passages. The flame may be made either oxidizing or reducing and, since the steel remains in the solid state, the sulphur gives no trouble. For soaking-pit operation the use of pulverized coal appears to be acceptable. We have not used pulverized coal under

boilers, except indirectly under the waste-heat boilers from the open-hearth furnace.

It is interesting to note that, in spite of the promising outlook presented by the possibilities in the use of pulverized coal, in actual practice the use of this fuel in open-hearth operation proved with us, as with others, to be unsatisfactory. Nor must it be forgotten that the trouble lay in that part of the operation which is not to be found merely in a study of fuel combustion.

There is reason to hope and to believe that the near future will enable the open-hearth furnaces in small as well as large plants to use pulverized coal as a fuel. But before this can be done there must be some experimenting, and the smaller plants must await the results of these experiments, which only the larger plants can be expected to perform.

FRENCH FOUNDRY APPRENTICES

Good Molders Turned Out—Interesting Contests in Molding and Casting

BY HENRY M. LANE

SOME time ago THE IRON AGE published photographs of foundry apprentices and of castings they had made in connection with competitions in the foundry of Ph. Bonvillain & E. Ronceray Co. in France. Mr. Ronceray has taken a great interest in the training of foundry personnel. His activities have been in three lines—first, his interest in the French Foundrymen's Association, which he organized some years ago; second, his interest in foundry apprentices; and third, his interest in an advanced school of foundry operators, of which we will have something to say later.

In regard to apprentices, the Ronceray firm as a manufacturer of molding machines has very little use for molders, as a comparatively small number will do all the work. But, realizing that apprenticeship in the old sense was dying out in France, Mr. Ronceray secured the services of a good molder, who was at the same time a good instructor, and employed a number of boys as apprentices. He then attempted to make real mechanics of them, teaching them not only the molding trade, but the making of patterns and pattern plates by the French pattern plate method.

A few other foundries had some apprentices but, by active work through the Foundrymen's Association and working with individual foundrymen, Mr. Ronceray managed to increase greatly the various apprentices in different shops until today there are 98 in the different iron shops in the Paris district, and something over 80 in the brass and aluminum foundries. He succeeded in getting the cooperation of the various foundrymen covering the treatment of the entire problem and particularly the instruction of apprentices.

To test the ability of the various apprentices, competitions are held each year of the first, second and third apprentices, and in connection with this a number of different types are given. The French Government Educational Department gives a number of medals for excellent work, also some diplomas. Another department of the Government and certain private individuals have made available textbooks on foundry practice, which are distributed as prizes. The contests are held in different foundries, some on Sunday and some on week days, and the interest the boys take in these contests is surprising.

Unusually Young Apprentices

From an American point of view the boys are very young, but this is made necessary by the French laws; the boys are allowed to be apprenticed at 13 years and, if they have made certain grades in school, with the parents' consent they can be apprenticed before this. Mr. Ronceray, with other manufacturers, has for several years been trying to get laws passed limiting the age to 14 years, but thus far it has been impossible. The average French family feels the need to have the children earning at as early a period as possible. So every boy is urged to make the best possible grades in school, so that he can go to work slightly before thirteen, and most of them accomplish it.

There are many trades which are ready to take the boys at this age, so trades which set a higher age limit would not be able to get apprentices. All the foundries try to get older boys, but the majority of the boys start at thirteen or a little before.

Managers Take a Lively Interest

The first of the three contests for the aluminum molders this year was held on Saturday, Nov. 17, at La Metallurgique Electrique. The second was held on Sunday, Nov. 18, for iron molders, at Fonderie Werts. This was for the second year boys. The third contest for the iron molders of the third year boys was held at Ph. Bonvillain & E. Ronceray's plant on Saturday, Nov. 24. The first year boys had their contest at Fonderie Dubarry on Sunday, Nov. 25.

The reason for holding the contest of the third year boys on Saturday was that it was an all-day contest, in which the boys were making comparatively large and difficult pieces. The judges were the owners and managers of some of the largest foundries in France and they were on the job with the boys and stayed throughout the contest, and in some instances for a considerable time thereafter, in carefully studying the work. In most cases the pieces were poured and the castings inspected, so that the committee judged both molds and castings. The boys are judged on a scale in which 20 represents the maximum, and are judged on three points—first, the time taken to make the mold; second, the quality of the mold; and third, the quality of the casting.

In America we have nothing corresponding to this type of apprenticeship and the direct personal interest taken in the boys by the owners, superintendents and foremen of the plants is surprising. The boys turned out are first class molders. Of course, they vary as to personal ability, but many of them at the end of their apprenticeship are better molders than it is possible to find in most of the jobbing foundries of the United States.

Insofar as possible, at the end of the apprenticeship each boy is encouraged to leave the shop in which he has served his time and to work in several other shops for experience. The boys who have gone forward and studied at the same time are then encouraged to take special courses in foundry matters at the French schools, but we want to make these schools the subject of a later article.

Merchantable Castings Produced

In the contest of third year boys at the Ronceray plant, one boy started at 7 a. m. to make a pattern plate to cast four stove legs. This was made by the French process and at 4 p. m. castings were made from the pattern plate and they were good, merchantable castings. The French pattern plate process certainly would serve America in many ways, if we had men who understood the process and would follow it out. The pattern plates are usually made of soft metal and will not stand the use of the vent wire, but, with the type of hydraulic machine on which they generally are used, venting with a wire is unnecessary.

In the contest of the second year boys those who are in the core room had to make cores from several core boxes and, in addition, had to take a block of dry core sand and file from it a special core that was supposed to be required in a hurry.

Progress Made on New Sheet Standards

Mills, Distributors, and Department of Commerce Cooperate to Eliminate Obsolete Gages and Sizes— Comprehensive Survey Now Under Way

A REPRESENTATIVE jobber in iron and steel products finds it necessary to carry more than 500 different gages and sizes of sheets, although only 40 per cent of these items represent more than 75 per cent of the annual sales. Orders for more than 50 items are so small in the course of any given year as to be almost negligible. It is obviously a great burden to provide storage space for large numbers of different gages and sizes which are practically obsolete and are sold only at extended intervals.

The persistence of these numerous specifications for which the demand has diminished almost to the vanishing point is explained both by competitive considerations and lack of accurate knowledge regarding the relative importance of different items. Warehouses have carried a complete assortment of sizes and gages in an effort to supply all possible wants of customers. For similar reasons, mills have found it necessary to roll this wide range of different products. Yet it has been found that various items which have been regarded as of fair importance from the standpoint of tonnage rolled actually represent only one-half of one per cent of total sales.

While the need for simplification of sheet standards has long been recognized, it remained for the United States Department of Commerce to take the initiative toward inaugurating a campaign to that end. At a meeting of the Metal Branch of the National Hardware Association of the United States at Cleveland in May, Major A. E. Foote, Division of Simplified Practice, Department of Commerce, Washington, delivered an address in which he explained what had been accomplished in the way of eliminating waste in various industries. In the ceramic industry, for example, 66 varieties of paving brick have been reduced to seven. Likewise fully 31 sizes of fruit baskets have been reduced to three. In concluding, he extended an invitation direct from Secretary Hoover to manufacturers and distributors of sheet and tin mill products to cooperate with his bureau in order that unnecessary items might be eliminated.

Promptly following his remarks, Chairman W. H. Donlevy of the Metal Branch appointed a sheet steel simplification committee comprising: Chairman, W. C. Carroll, Inland Steel Co.; L. D. Mercer, United Alloy Steel Corporation; W. E. Scott, Youngstown Sheet & Tube Co.; F. O. Shoedinger, F. O. Shoedinger Co.; Arthur M. Long, Trumbull Steel Co.; W. W. Sebald, American Rolling Mill Co. This committee set to work and made the following tentative recommendations applicable to all products: even gages, No. 10 to 28 inclusive; sizes—widths, 24, 28, 30 and 36 in.; lengths, 84, 96 and 120 in.; also 24 x 101 in. in gages 26 and 28, and 42, 44 and 48 in. wide by 144 in. long in No. 20 gage and heavier. These were unanimously adopted by all American sheet manufacturers, and for further work a committee, headed by Mr. Carroll, was appointed by the National Association of Sheet and Tin Plate Manufacturers to cooperate with the Metal Branch committee of the National Hardware Association and with the Division of Simplified Practice of the Department of Commerce.

A complete survey has been undertaken with a view of finding what items and how many are practically obsolete and can be eliminated without affecting in any way the requirements of the consumer. To secure this information it is necessary to review individual items on invoices over a considerable period and when all this information has been gathered, to relate each item to the total tonnage shipped. Much of this work, of course, is a matter of detail, and for that reason it is being done by clerical forces supplied by the National Association of Sheet and Tin Plate Manufacturers. At the conclusion of the survey, the results and recommendations will be submitted to the Department of Commerce and considered at a meeting called by Secretary Hoover at which all parties interested will be represented. The Department of Commerce will then publish a bulletin setting forth the conclusions arrived at by the parties at interest and will lend its moral support to the general establishment of the new standards.

The significance of the movement now under way can better be appreciated by quoting from an address by Secretary Hoover before the manufacturers of bedsteads, springs and mattresses, whose production as well as distribution problems have been greatly simplified: "A great deal has been accomplished in many industries in the direction of simplification. The idea is not new; it has been growing steadily for years. There are indeed many reasons why this question is of more importance now than ever before, because our distribution costs are enormously increased by additions to the cost of transportation, labor, rents and a thousand things, always including taxes. Clearly, if we are to restore the general level between incomes, we can do most if we decrease costs, particularly distribution costs. I know of no method that is more direct and fruitful than that of simplification."

Short Period of Holiday Inactivity in Birmingham District

BIRMINGHAM, ALA., Dec. 24.—The holiday lay-off in the Birmingham district will be short this year, but not so short as during the war. The cast iron pipe plants will be idle less than 10 days. The National Cast Iron Pipe Co. is to start its DeLavaud machines Wednesday and the old plant by Monday of next week. The American Cast Iron Pipe Co. will resume next Monday and the United States Cast Iron Pipe & Foundry Co. is to also be back in operation next week. Several of the sanitary pipe plants will be back in operation Wednesday and the bulk of them by next Tuesday.

The Gulf States Steel Co. will resume operations the middle of this week in its open-hearth furnaces at Gadsden and the finishing mills will also be started. Orders in hand and in sight warrant steady operation for some time. The big steel plant of the Tennessee Coal, Iron & Railroad Co. at Ensley will only see few days shutdown, until Wednesday.

By order of the United States District Court the estate of the King Pressed Steel & Mfg. Co. will be sold at public auction on the premises 13 Hawthorn Street, Newton, Mass., on Dec. 27.

NIAGARA FALLS POWER

Largest Hydraulic Unit Ever Built Has Been Put in Operation

On Dec. 18 the first of three new 70,000-hp. turbo-electric units was placed in operation at Niagara Falls, N. Y., in the plant of the Niagara Falls Power Co. in the gorge below the Falls. The turbine is direct connected to a 52,000-kw. generator operating at 12,000 volts. A total of $12,000,000 is involved in the new station. Some of the development of this project is detailed in the following paragraphs.

Two power companies on the American side of the falls were consolidated some time ago, the Hydraulic Power Co., absorbing the Niagara Falls Power Co., but taking the name of the latter. For more than 20 years the Niagara Falls company has had two stations, one on each side of an intake canal about one mile above the American Falls. Each of these stations has 10 units of 5500 hp. each. Tail water from the 20 turbines of these stations flows through a tunnel, egg-shaped, 19 ft. high and 17 ft. wide and about 7000 ft. long, running under the city and discharging under the International Bridge just below the American Falls. Power to the extent of 10½ hp. is obtained from each cubic foot of water per second passing through this station.

The Hydraulic Power Co. station No. 1 at the foot of the cliff below the falls has an open canal about 7000 ft. long bringing water from above the upper rapids. From the fore-bay water passes through penstocks to 13 units of 10,000 hp. each. This plant has been running for years. It produces power to the extent of 20 hp. per cu. ft. of water per second and discharges the water through draft tubes directly into the lower river.

During the war a new hydraulic company station was built adjoining the old and immediately upstream. This contains three units of 37,500 hp. each, producing power at 21 hp. per cu. ft. per second. This gives between 90 and 91 per cent efficiency between the water and the switchboard.

Another station is under construction immediately upstream from the last, which will contain three 70,000-hp. units and will, it is hoped, give still better efficiency—93 per cent being the goal.

This makes a concentration below the falls of 19 units (aside from two 1000-hp. units used for exciters) with an aggregate of 452,500 hp. Adding the 110,000 hp. above the falls there is a total of 562,500 hp. installed. The plant above the falls will be used solely as a standby, after the new plant is finished.

Treaty arrangements with Canada permit the United States to divert 19,500 cu. ft. per second (and Canada 25,000 cu. ft.) from the Niagara River for power production. It is anticipated that this plant, when the new units are in service, will consume this amount at full load and it is reported that the market is at hand for all power which can be produced.

Some of the outstanding features of the new 70,000-hp. units have to do with their great magnitude. Each is installed in a bay measuring 50 x 60 ft. The weight of the equipment in this bay will be 2000 tons, or two-thirds of a ton per sq. ft. A heavily reinforced concrete slab, 12 ft. 6 in. thick and containing 86 tons of reinforcing steel, will be used to carry this load and to tie everything tightly into the rock face of the cliff to prevent disturbance from the flow of water. Each turbine has a steel penstock 21 ft. in diameter extending (almost horizontally) 96 ft. back into the face of the cliff. It is here cemented into the solid limestone, through which the inclined channel has been cut from the canal above. The penstock is made of plates 1½ in. thick which were riveted by means of the mammoth bull riveter described in THE IRON AGE on page 332, Aug. 9.

Stator Castings of 65,000-Kva. Generator Arranged On Turntable, In Works of the General Electric Co., for Machining. The rotor running inside this stator is direct connected to a 70,000-hp. turbine operating under 213-ft. head of water. These units are the largest ever built

Each unit includes a turbine built by the I. P. Morris Co., Philadelphia, designed for a speed of 107 r.p.m. with operating head of 213½ ft. Each unit is controlled by a Johnson Hydraulic Co. penstock valve, these being the largest in the world. Some 3200 cu. ft. of water per second will pass through each unit at full power. The rotor of the turbine is a single casting weighing 105,000 lb., and revolves on a shaft 32 in. in diameter.

Built by the General Electric Co., the generator is also the largest in the world. The stator, shown in our illustration, is 26 ft. high and 35 ft. in diameter. It weighs 228 tons. The rotor has 28 8-ton poles, is 21 ft. in diameter, and weighs 425 tons. Its axis is verti-

cal and it is placed immediately above the casing of the turbine.

To handle the weights involved has made something of an engineering problem for the two 100-ton cranes installed over the six units of the two latest plants. The crane runway over the three biggest units has been designed for a load of about 500 tons. Each of the two cranes has had heavy doubling plates added to the upper and lower flanges of each girder, while eight-wheel trucks have been substituted for the earlier four-wheel trucks. Each of the 100-ton hoists on each crane has been duplicated by a second hoist, making a total of four. Equalizing bars to carry between the two hoists of each crane have been provided and a third equalizing hoist to act between these two. With this equipment it was arranged to handle the 425-ton rotor. The total weight carried by the crane hooks, including the weight of the equalizing bars, was to be about 470 tons.

It has been figured that the three new 70,000-hp. units will deliver as much energy as corresponding steam power calling for 2,000,000 tons of coal a year. Each of them has sufficient power to provide all the electric lighting required by a city as large as Boston.

Four-Wheel Drive Lift Truck

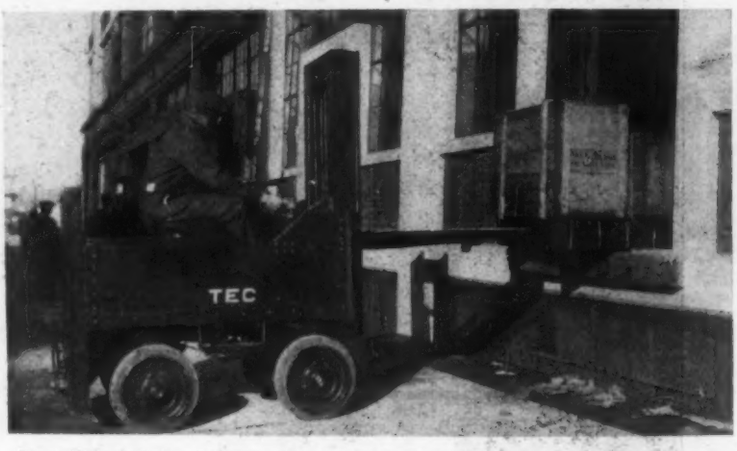
The industrial truck illustrated, known as Tec Uplift, was placed on the market recently by the Terminal Engineering Co., 17 West Forty-fourth Street, New York. A notable point is the absence of the small diameter pilot or trailer wheels. The claim is that the truck has, accordingly, freedom of action in traversing obstructions, as in crossing cobbled streets, or railroad crossings. It may also approach close to a freight car, to the floor of which material is to be lifted or from which it is to be removed, with the truck on the rail level. The feature is also emphasized as similarly advantageous in stacking goods in a warehouse.

The truck is available with varying heights of uprights to suit different requirements. In all cases the table will drop to a surface height of 5 in. from the floor. The table is 4 ft. long by 26 in. wide. Provision has been made for changing the style of table by dropping out the table and saddle shown, and placing in the uprights other types of saddles with horns—double tang, or vee type tables. The horn type is intended for handling coiled rod or reels, and material of similar form, and the double tang type, the top of which goes down to within 2 in. of the floor, for handling tin plate. Tables for handling tote boxes and other work are also available. The capacity on separable bodies ranges from a 2100-lb. evenly distributed load on 6-ft. platform to a 3000-lb. load on a 3-ft. platform.

At no-load the hoist operates at 50 ft. per min., and with a 3000-lb. load at 25 ft. per min. The hoisting unit is driven by an inclosed motor of the same type, rating, and frame as those used in driving the truck. The reduction is through worm and gear, the worm and shaft being integral. A solenoid is used to release the brake on the motor shaft and an automatic brake prevents the load from being lowered too rapidly.

It is claimed that the truck will operate effectively in snow and ice conditions, needing no specially prepared runways. The truck is carried on four wheels, which are individually driven, each being provided with a standard vehicle motor. There are three revolving members in the drive unit, consisting of motor shaft, reduction gear and pinion, which are integral, and the wheel itself. The entire unit is grease packed. The reduction gear and wheel rotate on roller bearings, and the motor has ball bearings.

Steering is accomplished by rear wheels only, and the turning radius is 6 ft. 9 in. The rear wheels are equipped with full leaf springs and are each provided with internal expanding type brakes actuating inside the reduction gear member. Brakes are controlled by the operator's foot. An odometer is provided on one wheel to record mileage. The battery is placed over the rear wheel in a special compartment arranged for the purpose, where it acts as a counterbalance for the load and a seat for driver. In addition to the counterbalancing effect thus provided for the load, more weight is attached at the rear of the truck in the form of plate. A coupling device is provided for use when it is desired to use the truck as a tractor.



Four-Wheel Drive Lift Truck. Absence of small diameter pilot or trailer wheels, permitting freedom of action in traversing obstructions, and close approach to freight car floor, is a feature

Census to Speed Up 1923 Statistics

The Bureau of the Census is now engaged in collecting statistics of manufactures covering the calendar year 1923. These statistics are compiled in accordance with the act of Congress of March 3, 1919, and the schedules have been prepared after conference with the associations and others interested in the various industries. The schedules will be mailed to the manufacturers on Jan. 2 and the director of the census is anxious to publish the statistics at the earliest possible date in order that they may be of the greatest possible commercial value. Manufacturers are urgently requested to forward their reports to the bureau at the earliest possible date, preferably before the end of January. The bureau has agreed to tabulate the results as rapidly as the schedules are received and publish the totals within a few days after the receipt of the last report.

If the reports are not made by mail it will be necessary for the Government to go to the expense of sending a special agent to the various establishments. It is to be hoped there will be prompt cooperation.

A report on the port of Philadelphia, including Camden, N. J., Chester, Pa., and Wilmington, Del., prepared in the office of the chief of engineers by the board of engineers for rivers and harbors of the War Department in cooperation with the bureau of research of the shipping board, has been issued. It is No. 4 of a series of reports covering important seaports of the United States. No. 1 on Portland, Me., No. 2 on Boston, and No. 3 on Mobile, Ala., and Pensacola, Fla., have already been issued. The purpose is to present information of value to vessel operators, producers, manufacturers, importers, exporters and all other persons having occasion to ship goods through our ports. A copy may be had for 75c. from the Superintendent of Documents, Government Printing Office, Washington.

Clement K. Quinn & Co., miners and distributors of Lake Superior iron ores, Duluth, Minn., have moved their Cleveland branch office from the Kirby Building to the Union Trust Building. L. E. Ives, sales manager, will continue in charge.

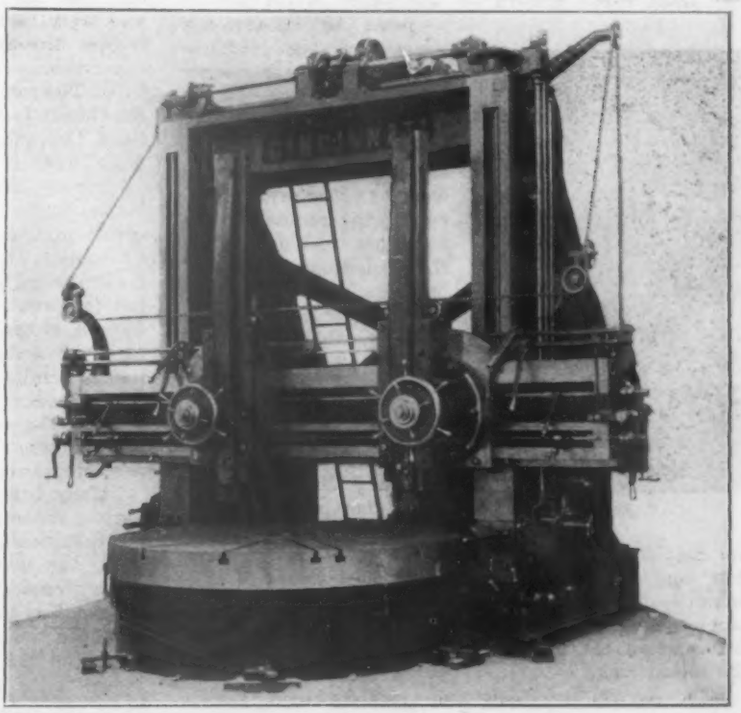
New Massive Boring Mill

An 8-ft. massive boring mill recently built by the Cincinnati Planer Co., Cincinnati, and incorporating special features is shown in the accompanying illustration. Ease of control is emphasized.

The table is driven by a bevel ring gear which is bolted to its under side. The bevel driving pinion is supported on both sides and is a separate unit from the driving gear box. The upper spindle bearing is adjustable to compensate for wear. The driving gear box is simplified to four speeds when used with a variable speed motor but has nine speeds when used with constant speed motor. All gears are of steel and shafts are of high carbon steel running in bronze bushings. The motor is mounted on top of the box and geared to the drive shaft. Levers for obtaining table speed changes have been placed directly at the operator's position.

The housings, which are extra high, are bolted, dowelled and tongued and grooved to the extension and tied together on top by a heavy box arch, thus reducing vibration. A cross brace serves further to stiffen the housings. The heads are of improved design. The capstan hand wheels shown permit of ready feeding by hand and may then be locked. The rams have long bearings and have steel racks bolted to them, which allows for replacement. The feed and rapid traverse are controlled from the side of the head so that when using the head in the center of the table the control levers are within reach. Sensitive handles are also provided to permit of close setting of tools.

The feeds are obtained through an all-steel gear box having eight feeds. This box has a vertical tumbler arrangement which automatically locks itself when placed in position. The rail is raised and lowered by an elevating device having positive clutches and a friction for safety. There is a limit stop that automatically throws out the clutch when the rail reaches maximum height. The cross bracing, arrangement of control levers and capstan handwheels may be noted from the illustration.



Special 8-Ft. Boring Mill. Among other features, the heads are of improved design. The capstan hand wheels shown permit of ready hand feeding

Dayton Foundries Merged

The Advance Foundry Co., Dayton, Ohio, has taken over entire plant and equipment, as well as the entire official and working organization, of the American Foundry & Casting Co., the merger to be known as the Advance Foundry Co. J. M. Green, present sales manager of the American Foundry & Casting Co., will assume the same position with the Advance Foundry Co. Both companies included in the merger have manufactured heavy, medium and light gray iron and semi-steel castings for a period of 25 years. The merger will greatly increase the output of the new company, which recently made extensive additions to the Advance plant. Anthony H. Kramer heads the new company and Alfred W. Schneble is secretary and treasurer.

Cleveland branches of the Westinghouse Electric & Mfg. Co. and the Westinghouse Lamp Co. have consolidated in one building their sales and service departments and their warehouses. A new five-story building, which is called the Westinghouse Electric building is located on Ashland Road and each floor contains 14,500 sq. ft. The executive, sales and clerical divisions are on the top floor. Two floors are given over to the service department and two to warehousing facilities.

Refractories Report for November Rather Unfavorable

Monthly report of the Refractories Manufacturers' Association for November was a rather unfavorable one, showing a substantial decrease in the shipments of both clay fire and silica brick, a considerable increase in cancellations, particularly of silica brick and further gains in stocks on hand, notably of clay fire brick. Net new business decreased as compared with October in both kinds of brick and makers started the last month of the year with the smallest order books they have had in many months.

The figures in 9-in. equivalents for November compare with those for the previous month (figures in parentheses being the percentages to economical monthly producing capacity in those plants reporting) as follows:

November Refractories Statistics

Clay Fire Brick

	November	October
Capacity reporting	74,839,727	74,212,811
Stock first of month	170,139,089(226)	164,324,610(220)
Production	51,860,352(69)	57,774,841(77)
Shipments	46,535,313(62)	53,316,214(71)
Stock end of month	175,464,128(233)	168,782,237(226)
New orders	44,334,971(59)	45,870,737(61)
Cancellations	1,816,039(2)	602,722(1)
Net new business	42,518,932(57)	45,268,105(60)
Unfilled orders	57,449,846(76)	60,737,806(81)

Silica Brick

Capacity reporting	22,565,500	22,565,500
Stock first of month	35,210,516(156)	34,473,914(153)
Production	7,987,023(35)	10,024,736(44)
Shipments	7,036,155(31)	9,288,134(41)
Stock end of month	36,161,384(160)	35,210,516(156)
New orders	7,818,602(35)	7,133,579(32)
Cancellations	878,089(4)	55,936(0)
Net new business	6,940,513(31)	7,077,643(31)
Unfilled orders	23,879,332(106)	23,974,974(106)

The stock on hand includes large quantities of shapes made up in advance of the receipt of actual orders and is in no sense "free stock"—that is, it could not be made to apply on new orders.

The actual free stock of 9-in. straights on Nov. 30 was approximately as follows:

Clay fire brick, all grades, 54,264,718 (68 per cent of the monthly economical producing capacity of those reporting.)

Silica brick, 7,923,779 (87 per cent of the monthly producing capacity of those reporting.)

Using Ledger Records for Gaging Credits

Interchanging Through a General Credit Bureau of the Facts of the Financial Relations Between a Buyer and Numerous Sellers

BY C. V. HOWARD*

THERE are many channels through which credit information is available, but one which has enjoyed rapid growth of late years is the service rendered by interchange bureaus giving confidential exchange of ledger experiences between members of the general credit association. All business men, particularly credit men, are interested in securing the means to minimize the bad debt waste so burdensome to honest business.

C. V. HOWARD

The interchange bureau provides tabulated reports which instead of relying on gossip, hearsays, rumors or the debtor's estimation of himself, disclose actual facts, such as "how long sold;" the highest credit extended by each concern reporting; amounts owing; amounts past due, if any; how long past due; dates of last sale; terms of sale; manner of payments; unfilled orders or contracts and other comments which come under a ledger transaction. Information of this character gives an indication of the moral risk.

The reports are easily and quickly read as the experiences are in column formation and it is not necessary to read long paragraphs of typewritten remarks to obtain the real and vital facts. Total amounts owing and past due can be ascertained almost at a glance and the entire report quickly summarized.

*Manager interchange bureau, New York Credit Men's Association, 320 Broadway, New York.

Realizing the necessity for closer cooperation on credit matters among concerns engaged in the iron, steel and hardware industries, the following New York men were factors in bringing about this needed credit reform through the confidential exchange of ledger experiences: J. L. Thompson, Yale & Towne Mfg. Co.; C. E. Thomas, United States Steel Products Co.; F. M. Brodhead, J. K. Larkin & Co.; T. J. Lynch, Concrete Steel Co., and W. H. Siebert, Hammacher, Schlemmer & Co., Inc.

During the past six years a great many business houses in these and other industries have solved their credit problems and saved many thousands of dollars by cooperating with the interchange bureau of the New York Credit Men's Association, which is operated not for profit but for service. At the present time the bureau is serving over 100 different industries many of which are closely allied. The clearance of debtors' names results in an interlocking of information among many trades and produces the strongest possible reports. The reciprocal branch of the service provides a free report for members on each debtor where experiences have been exchanged.

Many benefits are the result that the interchange bureau reports can be revised within three days. They are invaluable in revising accounts, in helping to eliminate the undesirable buyer, and they are valuable when a customer asks for an extension. They give the information and advice of those who know, disclose the accounts that are discounted or paid when due, minimize the bad debt waste, aid in keeping tab on special accounts (a great percentage of which go wrong), keep the credit files alive and right-up-to-the-minute with the latest information, suggest when the customer is overbuying or is buying in other than his legitimate territory, tell whether the customer is paying the new creditor promptly and allowing others to wait, and sometimes disclose that one may be mistaken in the belief that he is the principal creditor. To houses selling small accounts when the agency rating is blank,

PLAYING POLITICS

Radicals Block Organization of Both Branches of Congress

WASHINGTON, Dec. 24.—Recessing on Thursday of last week for the holiday session, Congress so far has lived up to forecasts. It has done nothing but wrangle and play politics. Indications are that this will represent the vast amount of its so-called labors throughout the present session, which is expected to adjourn about the time the Presidential campaign gets under full blast next summer.

The House finally has been organized, but the Senate still is in a stew over the chairmanship of the Committee on Interstate Commerce, a Democrat, Senator Smith, of South Carolina, ostensibly having more strength than his chief opponent, Senator Cummins, Republican, of Iowa. This spectacle of Congress with its various blocs and many quaint ideas and radical agitation, promises to be an extremely expensive one to the country. Not only is the country paying Congress enormous sums for doing nothing constructive, but faces a much heavier penalty by reason of its present attitude of side-stepping important issues. The hope is entertained, however, that pressure can be brought upon Congress to meet the issues squarely and dispose of them in a business-like manner, though the expectation may be entirely too much for achievement. The outstanding issue in this connection at present relates to taxes and the bonus.

While the Administration is absolutely opposed to bonus legislation, there appears to be a majority in Congress, many of them so-called Administration leaders, who insist that bonus legislation will be enacted even in the face of a veto by President Coolidge. At the same time, this majority is insisting that taxes be reduced.

Indications are that there will be a so-called tax reduction as it affects normal taxes and perhaps along the lines suggested by Secretary Mellon. But it is seriously doubted that surtaxes, which rest so heavily on business, will be cut. Even reduction of normal taxes will be theoretical, it has been pointed out, if the bonus legislation is to be enacted, because, obviously, the bonus will require not only the full Treasury surplus as it is accumulated, but will require enormous sums to cover the bond issue that would be necessary.

Secretary Mellon in a letter addressed last week to Representative Andrew on the cost of the bonus bill vetoed by President Harding declared that the total

Form DRS

NEW YORK CREDIT MEN'S ASSOCIATION — INTERCHANGE BUREAU REPORT.

The accuracy of this report is not guaranteed. The experiences given have been gathered in good faith from members and sent to you by this Bureau at your request without liability for negligence in procuring, collecting, communicating or failing to communicate the information so gathered.

Report on:

Blair Bros.
Blairville

HARDWARE

SUMMARY
(TO BE FILLED IN BY MEMBERS)

	Number		Number
Experiences		Pays when due	
Discounting		Unsatisfactory	
	Amount		Amount
Owing		Past Due	

MANNER OF PAYMENT

"Manner of Payment" is indicated in columns below by figures.

1. Discounts
2. Pays when due
3. Pays slow
4. Slow but considered good
5. Settles by notes
6. Pays notes when due
7. Slow and unsatisfactory
8. Settles with Trade Acceptance
9. Pays acceptances when due
10. Makes extent claims
11. Takes unearned discounts
12. Refuses to pay interest
13. Pays draft
14. Don't pay draft
15. Account now in attorney's hands
16. Collected by attorney

SPECIAL REMARKS

A. Pays according to agreement
B. Requests to accept draft not on extend
C. Carries out contract
D. Asks concessions of contract
E. Asks for cancellation
F. Makes cancellations
G. Asks postponement of delivery
H. Is marked for quick delivery

TERMS OF SALE

OA - Cash in Advance
COD - Cash on Delivery
CAD - Cash against Documents
SDBL - Sight Draft against Bill of Lading

Group No.	How Long Sold	Highest Credit in Past year	Amount Owing	Amount now Past Due	How Long Past Due	Date of last sale & Yr.	Manner of Payment (See No.)	Terms of Sale	REMARKS
1	-	-	-	-	-	-	-	-	One bill $75 not due
2	yrs	20	10	-	-	1'22	3*	1/10/30	*30 days
2	1919	38	-	-	-	3'21	4	30 days	
2	1920	50	30	11	30days	1'22	3*	30 days	*30-60 days
2	1913	204	194	-	-	12'21	4	Regular	
2	yrs	12	-	-	-	7'21	4	2/30	
4	1906	19		-	-	7'21			
									60 days
2	10yrs	700	400	200	-	1'22	4	60 days	
5	1915	-	-	-	-	2'19	maturity	1/10/30	Small-Inactive
2	yrs	805	100	75	30-60 days	12'21	4	2/10/30	
2	1917	-	-	-	-	12'18	1-2	1/10/30	
3	1913	13	9	7	45days	1'22	3*	2/10/30	*30 days

This is a completed report showing what the inquiring member received as a result of his inquiry. All other interested members received free of charge a complete copy of the report in exchange for their experience.

How the Credit Information Is Compiled and Made Available to All Supplying the Data Is Here Shown. The cut is a reproduction at a reduced scale of the blank used by the New York Credit Men's Association

or less than $500, the reports are valuable. The cost of several years' dues in the bureau may be saved by one reciprocal report for which there is no charge.

The service of the interchange bureau, the foundation of which is cooperation, reduces to a minimum the details of gathering credit experiences on a debtor. Petty jealousies between competitors have been swept aside. The old days of secrecy in regard to accounts have passed Actual ledger experiences are confidentially given in detail.

---

direct cost of that proposed bonus would be $5,085,833,687, and an average for the first four years of over $250,000,000 annually. There are active plans under way to revive this identical measure.

"It must be obvious to any impartial mind that a new obligation of the United States made in time of peace to pay over $5,000,000,000, of which $1,000,000,000 comes in the first four years, and an average drain on the Treasury for 20 years of $211,000,000 a year, which is one-fifth of the total pre-war cost of Government, cannot be undertaken without serious economic consequences," said Secretary Mellon. "If such a commitment is made, any reduction of Federal taxes upon a comprehensive plan will probably not be seen in this generation."

In the face of the unanswerable arguments of Secretary Mellon showing the stupendous burden that the bonus would place not only upon the present generation, but upon posterity as well, a politically made Congress still is rushing forth to saddle this crushing load upon the country. It is evident that the members of the Ways and Means Committee of the House now considering tax revision are trying to find some magical means of providing a bonus and a tax reduction at the same time, and endeavoring to lead the country into the belief that payment of the bonus would not be felt.

It is expected that the Ways and Means Committee will make a report by Jan. 10 on the administrative features of the new tax bill, after which bonus legislation is expected to be taken up, thus being given precedence over any so-called tax reduction program. One of the discussions made regarding the administrative features relates to proposed changes in the capital assets feature of the present tax laws by which gains on capital transactions, including stock dividends, would be taxed under the income provision rather than on the present basis of 12½ per cent on capital gains.

Treasury experts have been asked to work out the proposed change. Day to day meetings will be held by the subcommittee of the Ways and Means Committee to consider technical features while Congress is in recess.

Compressed Air Trade Standards

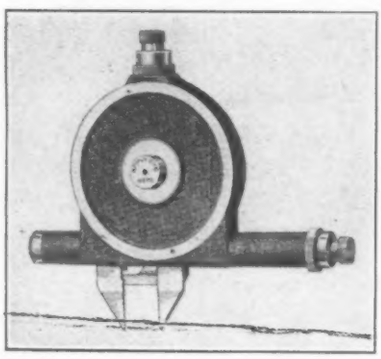
In a pamphlet of 40 pages, the Compressed Air Society publishes the results of extended study and research on standards for compressed air equipment. This includes not only nomenclature and terminology but questions of compressor speeds, standard capacities and pressures, installation and care of compressors, cleaning the intake air, lubrication and standards of practice in compressor testing.

Optical Gear Tooth Micrometer

The optical gear tooth micrometer illustrated, which is being manufactured by Carl Zeiss, Jena, Germany, has been placed on the American market by George Scherr, 143 Liberty Street, New York.

The instrument permits of direct reading by scale of chordal thickness on the pitch line and the addendum of a gear tooth. The graduation of the scale is sharply defined and magnified a thousandth part of an inch appearing to the eye as large as one-sixteenth of an inch to the naked eye. Quick adjustment to within one-thousandth of an inch by the scale is a feature, and one-ten-thousandths may be conveniently estimated between graduations.

In setting, the instrument is held closely to the eye and by looking through the small aperture in the center



Optical Gear Tooth Micrometer. The instrument may be quickly set to exact chordal thickness and addendum. The scales engraved on the glass are shown below

two well-defined scales engraved on glass are seen, one of the scales running vertically, the other horizontally through the center of the field, as shown in the illustration. The scales are moved by turning the micrometer screws until the two measurements required, thickness of tooth on the pitch line and the addendum, are indicated. The measuring jaws of the micrometer are then set and the instrument is ready for use.

Cutters, gages and forming tools for producing the latter may also be checked. The range of the instrument is from 18 to 1½ diametral pitch. The weight is 1 lb.

Holiday Quiet in the Connellsville Region

UNIONTOWN, PA., Dec. 24.—With little increase in coal production in the Connellsville region, coke output is remaining about stationary, a gain of only 2000 tons being shown in combined furnace and foundry interests for the week ending Dec. 15 over the preceding week. Generally speaking, contracting for the first quarter or half of the new year is not being done. A 27,000-ton coke contract is reported from one plant without price being divulged, although it is understood that the figure was around $4.50. One other large corporation is understood to have contracted for a large portion of its capacity for the first quarter in coke and coal, but aside from this few such orders have been entered. The general tendency on the part of the independent coke operators is to withhold entering into contracts for the first quarter.

Absence of an unusual pre-Christmas buying to protect consumers over the holiday's slump tended to soften the market during the week.

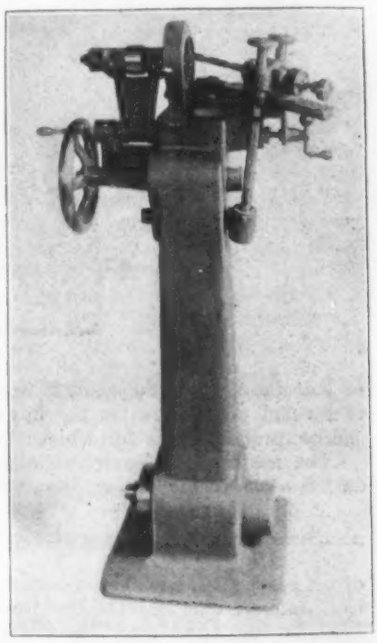
The Frick Coke Co. plants operated six days this week as a bonus to employees, the company having been operating four and five days a week for several months.

One plant of considerable size in the region took on an order covering operation for the month of December, the price representing cost, in order to give employees work during the month in a spirit of Christmas.

Drill Pointer for Two Flute Drills

A new machine for grinding drills, designated as the No. 2 drill pointer, having a range from No. 60 to ½ in. two flute drills has been added to the line of the Oliver Instrument Co., Adrian, Mich.

As in the company's larger machines, the drill point is produced automatically by passing the wheel across the point of the drill while the drill is turning and at the same time feeding the wheel into the drill by means of a cam and spring, uniformly increasing the angle of point clearance as the web of this is approached. The duty of the operator is merely to set the drill in the correct relation to the setting gage. Only one setting is required for grinding both lips, both being of the same length.



Automatic Drill Pointer for Grinding Two-Lipped Drills. The capacity is for No. 60 to ½ in. inclusive

The arrangement of parts of the machine may be noted from the illustration. The grinding wheel is driven by a ¼-hp. 1750-r.p.m. motor located in the base of the machine. The mechanism is operated by means of a hand wheel on the crankshaft. The pulley, pinion, gear and clutch of the full power driven machines are omitted, and the machine is simplified by the omission of the nest of change gears and shifter mechanism required in the No. 4 and No. 5 models, which are for grinding three or four-fluted drills.

The machine is designed with a universal or swivel carriage which permits grinding of drills to any point angle desired. The standard equipment includes the driving motor, a large and small bushing holder and a V rest for supporting the end of the drill, a No. 3 Jacobs Chuck, a No. 1 and 2 Morse taper sleeve and a wheel truing device. Height is 50 in., size of base 17 x 18 in. Weight with standard equipment is 315 lb.

Domestic sales of oak leather belting reported for November by the Leather Belting Exchange, representing about 60 per cent of the total product, amounted to 347,202 lb., valued at $642,324, or an average of $1.85 per lb. This compares with 447,264 lb., $827,438 and $1.85 in October and with 467,816 lb., $826,164 and $1.77 per lb. in November a year ago.

CONTENTS

December 27, 1923

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Contracts and Orders in Steel

A REFORM that was unsuccessfully urged as a proper subject of united effort and has now occurred without such effort is not without interest. At intervals it used to be urged that the steel industry should make its sales contracts binding instead of leaving fulfillment to the preference of the buyer. The so-called contracts were denominated "accordion contracts," "jug-handled contracts," "option contracts" and the like. All this was only a few years ago. At one time the matter came before the American Iron and Steel Institute and a committee was appointed to formulate a method of bringing about a reform.

What was sought, chiefly, was means whereby the contracts as they were then made could be enforced against the buyer, who, according to the usual practice, could ignore the contract by refraining from specifying, and this he did when it suited him; in other words, when the material could be bought in the open market at less than the contract price. If the mill holding the contract elected to meet the outside price, as was often the case, it was merely selling the material a second time. It was not enforcing the contract.

Inasmuch as buyers did not, as a rule, take out their full contract tonnages, it was the custom of mills to oversell. If it was estimated the buyer would specify two-thirds of his tonnage, the mill endeavored to oversell by 50 per cent. Then it would break even. When the market advanced, the buyer was likely to specify in full. Then the mill fell behind in deliveries. The buyer received all the steel he currently needed, with low-priced tonnage still coming to him, and was safe in piling additional specifications on the mill. In times of great activity, market reports were full of statements as to how far "behind" mills were in making deliveries, and there were cases when the period ran to six months.

All this may sound like ancient history, but it is by no means ancient by the count of years. When reform was talked of, what the mills seemed to want was means to enforce these same contracts in a falling market. There was little inclination to recognize the point that the difficulty lay not in the terms of the contract nor in the practice of permitting the customer to evade, but in the making of the contracts. One should not expect to be able to make contracts so far ahead. The mills were afraid not to contract ahead, lest their competitors should get their business, and while they did not say so they no doubt felt that the existence of these contracts would help to sustain prices, for should a mill cut prices it would thereby invalidate its large contract tonnage.

Through the influence of the experience in Government control of the market during the war, the scarcity of steel in 1920 and a general accretion of courage, the steel mills have very largely reformed their practice, without any concerted effort. Contracts are still made, but they are only for short periods. In general, the farthest forward deliveries are for construction jobs, where the price has always been a firm one.

The steel industry has not lost in strength and stability by this change. It has gained. Its prosperity must run with the activity and prosperity of its customers and not by phrases in contracts or by taking customers into court. The various competitors have as much desire to maintain prices as they had when the jug-handled contract was in full sway.

How to Kill the Bonus

THE two great English-speaking nations now find themselves in the same position as to government, for in neither case is there a party with a clear majority upon which it can depend. This condition often results in inefficiency and confusion. This will probably be true in England, and the prospects at Washington are far from being clearly defined. From some recent maneuvers it would appear that party advantage will be a chief objective; hence more than a possibility of a stalemate on some important measures.

The business interests of the country have much to be thankful for, especially for the courageous declarations of President Coolidge in opposing the bonus and favoring the Mellon plan of reducing taxation. At present the supporters of the bonus have a clear majority in the House, while in the Senate the vote will probably be very close. The attitude of several Senators whose position is not definitely known promises to settle the question whether the bonus will be passed

and taxes remain substantially as they are or the bonus be defeated and taxes reduced so as greatly to relieve the taxpayers of the country. Secretary Mellon has pointed out that his plan would result in a reduction of the income tax not only for the 7,000,000 income taxpayers but for the entire 110,000,000 people in the United States. His forecasts made in previous reports that high taxes would drive capital out of business productive of revenue to the Government are being fulfilled in the progressive diminution in the number of taxable incomes in excess of $300,000.

The action taken by the Ways and Means Committee of the House a few days ago shows that even in that branch of Congress the effect of public opinion in opposition to the bonus is being felt, for it was decided to take up consideration of the Mellon plan as to administrative features before considering the so-called "adjusted compensation" bill.

If the people of the United States agree with President Coolidge in opposing war taxes in time of peace, they will make that fact known to their representatives in Congress, particularly their Senators. Emphatic and continued expression of disapproval of the bonus and of approval of tax reduction cannot fail to have its effect upon the action of Congress.

If the people of the country are heard from vigorously, the expected veto of the bonus will not be over-ridden. It seems trite to advise writing to Congressmen, but seldom has there been a time in all our history when the opportunity of the voters to use their influence has been so clear-cut or the duty to do so more imperative.

Tax Reduction

THERE ought not to be any argument respecting Secretary Mellon's proposal to reduce income taxes. Our present high taxes are a misfortune. The ability to reduce them is a blessing. All should want to enjoy it and we think everybody does.

Opposition to this benign measure can reflect nothing but selfish interests, such as the wish of politicians to enhance themselves by taking money from some people and giving it to others, by appropriating it for pork barrel purposes, and by squandering it miscellaneously; or the wish of disgruntled people to concentrate the expense of government upon a relatively small class of taxpayers.

Our existing system of Federal taxation, which was framed hastily during the stress of war, is gravely faulty and economically harmful. Its greatest evil is in the sharply increasing surtaxes. In the emergency of war the rich were reasonably required to give to the nation a large part of their income that they did not need. In peace, when there is no longer the exigency of national salvation, the question is not whether the rich can afford to pay, or whether they ought to be soaked just because they are rich, but rather is it whether the people ought to continue a system that is so harmful to themselves as a whole. The harmfulness is so clear that there ought not to be need to point it out.

The surplus income of the rich goes normally for constructive uses that are of benefit to everybody. If it be taken away from them by the Government it is bound to be squandered to a large extent. The maximum evil would appear in taking it away from them and distributing it to another class of people, like the ex-soldiers, as a bonus. Even the possibility of committing such economic crimes is but ephemeral, for with destruction of the incentive to create a surplus income there would sooner or later cease to be any. These arguments are not academic, but are distinct reflections of what actually has been happening.

There reasonably may be discussion of the manner by which Secretary Mellon proposes to make the reductions. The proposed abolition of what are called nuisance taxes is generally approved. Yet those taxes, which partake of the nature of a sales tax, are in theory rather commendable. To a considerable extent their payment is optional, to a considerable extent they fall on luxuries, and their collection is not difficult. The plan for the reduction of income taxes is eminently fair. According to it amelioration is spread among all classes of taxpayers in a well-equalized manner. We believe that it would be economically beneficial to make even greater reduction in the surtaxes, especially on earned incomes, and to introduce measures for the collection of taxes from many wage earners who now escape.

However, the recommendations of Secretary Mellon, which are those of an expert, are probably far better than anything that Congress is likely to be able to evolve, and we hope that there will not be too much tinkering with what is essentially a good plan. Tax reduction ought to be effected by Congress in short order and as a non-partisan measure. That is, perhaps, too much to hope from the hands of politicians, but Secretary Mellon's proposal has so captured the popular imagination that the politicians will need to watch their steps. The people may not be able to understand our complicated economic problems, but there is not one of the millions of income taxpayers who does not know what it means to be requisitioned less severely and who does not like the idea, and who does not want it to be consummated quickly.

Pig Iron and Steel Production

THERE is a remarkable difference between the respective tonnages of pig iron and steel ingots produced this year and last. The statistical comparison is that pig iron production increased 48 per cent from 1922 to 1923, while the production of ingots increased only 25 per cent. The relation for a series of years is shown in the following table:

	Pig Iron Gross Tons	Steel Ingots Gross Tons	Excess Ingots Over Pig Iron Per Cent
1916.....	39,434,797	41,401,917	5.0
1917.....	38,621,216	43,619,200	12.9
1918.....	39,054,644	43,051,022	10.2
1919.....	31,015,364	33,694,795	8.6
1920.....	36,925,987	40,881,392	10.7
1921.....	16,688,126	19,224,084	15.2
1922.....	27,219,904	34,568,418	27.0
1923.....	40,250,000	43,000,000	6.8

Reference to statistics of pig iron production by grades shows that the wide variations shown

in the above table are not due to activity at foundries varying out of line with activity at steel mills. In 1918 there was a little more activity at steel mills than at foundries, due to the special requirements of the war. The normal for the present and the recent past may be read from the table at 10 to 12 per cent excess of ingot tonnage over pig-iron tonnage, and the higher percentage in 1921 does not count particularly, as both tonnages were small.

It is plain, therefore, that the high relation of steel ingots to pig iron in 1922 was altogether exceptional. The cause, of course, was the great coal strike, which made coke very scarce. The consumption of scrap in steel making in 1922 must have been very large, for there is at least 4,000,000 tons of extra ingot production to be accounted for. All stocks of pig iron were exhausted, but the stocks at the beginning of 1922 cannot have been large.

Imports of pig iron in 1922 were insignificant, relative to the tonnage of steel to be accounted for. Some pig iron previously bought came in during the first three months of 1923, but added only a trifle to the apparent excess of pig-iron supply in 1923, when pig iron ran rather high relative to ingots. That stocks of pig iron are considerably higher now than at the beginning of the year is well known.

It is made plain, in the retrospect, that the steel industry can in an emergency gather together a large tonnage of scrap. Just where it all comes from no one can say. There was no very remarkable advance in scrap prices during 1922, relative to prices of billets or finished steel products. Along this same line, when prices of scrap last August, September and October were at particularly low levels, the offerings were light. Scrap was being held back for better figures. Apparently there will normally be a large reserve of scrap to fall back upon when it happens to be particularly needed.

CORRESPONDENCE

When Welding Fails

To the Editor: The average firm using welding for production has long recognized the importance of ideal welding conditions, but the average foundry or factory which uses welding to reclaim broken parts or save defective castings certainly should see that their foreman investigates more thoroughly the application of welding to their various problems.

In the average plant of the last-mentioned class we usually find the welding in charge of the shop foreman or master mechanic. He is usually well educated in problems of every sort except welding. Welding as a rule is forced upon him; the firm buys an outfit and hires a welder, and of course the welder has to recognize someone in authority as boss, so the master mechanic or the shop superintendent automatically assumes the rôle.

Welding is new to him, and if he happens to get a good welder for the first one he readily sees that remarkable things can be accomplished. He accepts this result as a matter of course, rarely stopping to think or reason why. The fundamentals such as fusion, neutral flames, fluxes, pressures, selection of tips, proper care of regulators and torch, the expansion and contraction, the cause of a hard cast iron weld, and many other things which enter into the work, are never grasped by him.

This state of affairs usually goes on until some unusual job comes up for which the welder needs some special equipment, such as firebricks, flux, special wire, or charcoal, or any one of the many things that are often needed. The "boss" knows nothing of the vital importance of these things and tells the welder he can get along without them. The welder has two courses he can follow. He can go ahead and spoil the job, or he can quit. A good welder will usually quit rather than tackle a job he knows he is not equipped to handle. Of course some other welder is usually hired who will tackle the job thinking only of his "so much an hour," and thus add another failure against the process of welding.

I am going to cite three little instances that were recently brought to my attention, to illustrate my point.

A certain large firm ran into a small aluminum proposition that needed some small shrinkage cracks and blowholes welded, so they bought equipment and expected a man to successfully weld the small castings on a barrel out of doors. Another concern wanted some wrongly machined castings built up to size, and offered the welder no chance to preheat them, then found fault because the welds were hard. Another firm had a cast iron pot to be welded, the welder preheated the pot, and after welding carefully covered it over to prevent shrinkage cracks. After the welder had gone out to some other part of the plant to another job, the shop foreman, who was in a hurry for the pot, uncovered it and allowed it to cool too quickly and then found fault with the welder who did the job because it cracked. These three instances show how little the average man in charge of a shop knows about welding.

A firm which expects to get the most out of its welding should first get the services of a first class experienced welder and then realize that the welder needs all the help and cooperation he can be given. The welder knows his needs and will not ask for anything that is not necessary. Today nearly any public library has many books and magazines on the subject of welding, and every man who is responsible in any degree for the success of welding in his shop should equip himself with a reasonable knowledge of the art of welding.

Welding associations and manufacturers of welding equipment are today trying hard to send into the field high grade, intelligent welders, equipped with all the proper knowledge to produce good welds, but after obtaining this knowledge it avails them little if the firms for whom they work do not do their share toward helping them in every way to carry out the theories so essential to a successful weld. R. K. RANDALL.

Cleveland School of Technology, Y. M. C. A., Cleveland.

Molders in Stove Plants Granted Advance in Wages

An increase of 10 per cent in wages of stove molders has been granted by the membership of the Stove Founders' National Defense Association, following the conclusion of negotiations at Atlantic City with the officers of the International Molders Union of North America. The new wage scale goes into effect Jan. 1. The settlement was in the nature of a compromise, the molders having asked for an increase of 20 per cent, with a minimum day rate of $8. The 10 per cent advance brings the minimum rate for day workers to $7.25 for eight hours.

At St. Louis notice has been served on the Contracting Lathers' Association by the Wood, Wire and Metal Lathers' Association that beginning April 15 the wage scale will be for wood lathers, $10 per 1000 laths, instead of $8, at present, and $15 a day for metal lathers, instead of $11. Wood lathers nail from 1300 to 1500 laths a day, and the new scale would yield them $13 to $15 a day.

British Iron and Steel Market

Pig Iron Firm but Quiet; Steel Strong—Ruhr Resumption Very Slow—£1,000,000 Welsh Tin Plate Selling Corporation Formed

(By Cable)

LONDON, ENGLAND, Dec. 24.

Pig iron is quieter, owing to holidays, but the market's close was firm. The output has been increased further, Pease & Partners, Ltd., having blown in two hematite furnaces. The total number of Cleveland furnaces of all kinds now operating is 48. Hematite is strong, with an upward price tendency.

Steel is strong on increased domestic buying, though the tendency of some consumers is to await the Ruhr developments. Plate rollers have good orders on hand.

Continental markets are weak, but the position is difficult to gage, owing to a general reluctance of overseas buyers to commit themselves to forward contracts and the uncertain position of the works' order books.

In the Ruhr the resumption of operations is proceeding very slowly. Gutehoffnungshütte has two furnaces (out of eleven) now blowing. Friedrich Krupp, A. G., has two units (out of ten) blowing at Rheinhausen. Hoesch Eisen & Stahlwerk, Dortmund, is starting two furnaces shortly (out of seven). Rheinische Stahlwerke (six furnaces) and Phoenix, A. G. (eighteen), still are idle.

At the Thyssen plants two furnaces and the thin sheet mill are operating. The Bochumer Verein is making a start with a small labor force. Owing to the introduction of the 10 hr. day the works will not require all of their previous workers.

Tin plate is firm, with good business still passing, both domestic and for export. Oil plates are quiet, as buyers previously have purchased up to June.

A Welsh tin plate corporation is being formed with a capital of £1,000,000 ($4,866,500 nominal; $4,340,000 now) to absorb a number of tin plate merchant firms and handle the output of Richard Thomas & Co., Ltd., Swansea, Grovesend Steel & Tin Plate Co., Ltd., Gorseinon, W. Gilbertson & Co., Ltd., Glamorgan, and other works. This is the outcome of efforts of W. J. Firth to consolidate the works as against the merchant houses and wipe out the middlemen. The merchant firms absorbed include W. J. Firth, London; S. J. Burrell Prior, Ltd., London; Cyril W. Massey & Co., London; Phillips & Hill, London; F. S. Candelin & Co., London; McLean, Connor & Co., Kennedy, Berry & Co., Ltd., London, and Wedekind & Co. Capital was provided by the works contributing £2,500 per mill.

Galvanized sheets are weak on poor demand.

Black sheets are firm but demand is sluggish. The works are well sold ahead.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.34 per £1, as follows:

Durham coke, delivered	£1	18½s.	to	£1	19s.	$8.34	to	$8.46
Bilbao Rubio ore†	1	4				5.21		
Cleveland No. 1 foundry	5	6½				23.11		
Cleveland No. 3 foundry	5	0				21.70		
Cleveland No. 4 foundry	4	19				21.48		
Cleveland No. 4 forge	4	18				21.27		
Cleveland basic	5	0				21.70		
East Coast mixed	5	2½	to	5	3½	22.24	to	22.46
East Coast hematite	4	19	to	5	0	21.48	to	21.70
Ferromanganese	17	0				73.78		
Ferromanganese*	17	0				73.78		
Rails, 60 lb. and up	8	15	to	9	15	37.97	to	42.31
Billets	8	5	to	8	15	35.80	to	37.97
Sheet and tin plate bars, Welsh	8	18¾				38.79		
Tin plates, base box	1	3¾	to	1	4¼	5.15	to	5.26
						C. per Lb.		
Ship plates	9	15	to	10	5	1.89	to	1.99
Boiler plates	13	0	to	13	10	2.52	to	2.62
Tees	10	0	to	10	10	1.94	to	2.03
Channels	9	5	to	9	15	1.79	to	1.89
Beams	9	0	to	9	10	1.74	to	1.84
Round bars, ¾ to 3 in.	10	10	to	11	0	2.03	to	2.13
Galvanized sheets, 24 g.	18	10	to	18	15	3.58	to	3.63
Black sheets, 24 gage	14	0				2.71		
Black sheets, Japanese specifications	15	5				2.95		
Steel hoops	12	10	&	12	15*	2.42	&	2.47*
Cold rolled steel strip, 20 gage	17	12½				3.42		
Cotton ties, Indian specifications	15	0				2.91		

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:								
Belgium	£4	13½s.	to	£4	15s.	$20.29	to	$20.61
France	4	13½	to	4	15	20.29	to	20.61
Luxemburg	4	13½	to	4	15	20.29	to	20.61
Billets (nominal):								
Belgium	6	2½	to	6	7½	26.58	to	27.67
France	6	2½	to	6	7½	26.58	to	27.67
Merchant bars:						C. per Lb.		
Belgium	7	5	to	7	15	1.40	to	1.50
Luxemburg	7	5	to	7	15	1.40	to	1.50
France	7	5	to	7	15	1.40	to	1.50
Joists (beams):								
Belgium	6	15	to	7	2½	1.31	to	1.38
Luxemburg	6	15	to	7	2½	1.31	to	1.38
France	6	15	to	7	2½	1.31	to	1.38
Angles:								
Belgium	8	0	to	8	5	1.55	to	1.60
¼-in. plates:								
Belgium	7	17½	to	8	2½	1.53	to	1.57
Germany	7	17½	to	8	2½	1.53	to	1.57
⅜-in. plates:								
Luxemburg	7	17½	to	8	2½	1.53	to	1.57
Belgium	7	17½	to	8	2½	1.53	to	1.57

New Trade Publications

Flexible Couplings.—Smith & Serrell, Central Avenue and Halsey Street, Newark, N. J. A 32-page catalog devoted to Francke flexible couplings for direct-connected machines of all descriptions. These couplings are made entirely of metal and for any size, speed or power which may be desired. They were first used in 1910 for small steam turbine drives and have been subject to development and standardization since that date. Among the uses illustrated in the catalog are connections between motors and rubber calender machines, a steam turbine connection driving equipment at both ends of the shaft, machine tools, circulating pumps, steel mill drives, fans, air compressors, generators, ball and tube mills, oil pipe lines, hoists and mine pumps, marine engines, etc. The catalog gives dimensions of various sizes designed for various purposes, together with diagrams, sections, etc., to illustrate connections.

Handbook of Conveyor and Elevator Belting.—Goodyear Tire & Rubber Co., Inc., Akron, Ohio. A 64-page handbook in flexible cover outlining principles of design and operation applying to belt conveyors and to belt elevators, separately. The information covered is based on practice and years of experience. Many illustrations are given showing types of equipment and applications to industries of various kinds. Questions of belt stretch, take up, loading, joints, inclines, lubrication, etc., are handled, one after the other, with such design items as belt tension, number of plies, etc., for handling specific conditions.

Burning Fuel Oil.—Mahr Mfg. Co., Minneapolis. 16-page pamphlet devoted to the correct method of burning fuel oil and dealing with different types of atomizers, the high temperatures obtained with the closed combustion type burner and methods of venting the furnace. Different types of furnaces are considered, together with the refractory lining. Finally, there is discussion of oil consumption and the cost per ton of castings annealed and the cost of heating rivets.

New Books Received

Eleventh Annual Report of the Secretary of Commerce, 1923. Pages 235, 6 x 9 in. Published by the Government Printing Office, Washington. Price, 20c.

Lehrbuch der Eisenhüttenkunde. By Dr. Bernhard Osann. Pages 923, 6½ x 9¼ in.; illustrated. Published by Verlag von Wilhelm Engelmann, Leipzig, Germany. Price, bound, 32 gold marks; unbound, 29 gold marks.

Labour in the Coal-mining Industry. By G. D. H. Cole. Pages 274, 6¾ x 10 in. Published by Oxford University Press, 35 West Thirty-second Street, New York. Price, $2.50.

Iron and Steel Markets

BUYING BROADENED

Holiday Shutdowns Mark Year End

Semi-finished Steel Contracts—Price Situation Strengthened—Foreign Competition

Further buying, broad in scope if not great in quantity, marked the week. Sales usually were not at expense of prices, but indications still are that buyers see no protection in contracts and cover only for closely estimated requirements.

Steel making output may taper off in the remainder of the year, as numbers of rolling mills, taking advantage of the satisfied demand for immediate deliveries, are employing a part or all of the holiday period to make repairs. At that, the production of steel ingots for 1923 seems likely to exceed 43 million tons, and the pig iron make will be a record at over 40 million tons.

The idea of price firmness has spread to semi-finished steel, first quarter contracts in rerolling billets at the $40, Pittsburgh, price being reported. One Middle Western sheet bar producer has so heavily booked for the quarter that it has withdrawn from the market. Some of the sheet bar business provides for prices obtaining at the time of shipment. Forging billets alone seem not definitely strong at $45, because obtainable from more mills than usual.

Sheet buying has been notably heavy. December orders of independent makers are estimated in excess of 300,000 tons, but it is not yet clear that price shading has disappeared.

In tin plate, following a record output of 40,000,000 boxes for 1923, the leading producer is solidly committed against its maximum production for the first half of next year and the position of the independents is almost as favorable.

The outstanding structural steel activity is shown by awards of 26,000 tons, including 8650 tons for bridge work. Fresh inquiries amount to 37,000 tons, including 11,000 tons for the Chicago Tribune tower and 6050 tons for assembling plants for the Ford Motor Co. November bookings of fabricated steel, according to Census Bureau statistics, amounted to 135,000 tons, better than the average for the six months preceding and 10 per cent more than November of last year.

Railroad equipment business was lean, 1225 cars being the total of purchases, an equal number the total of inquiries and none taking much steel. Bids are now all in on the Southern Pacific cars, requiring some 100,000 tons of plates, shapes and bars. The New York Central has distributed 30,000 tons of tie plates and 25,000 kegs of track bolts.

The appearance of inquiries for a considerable tonnage of pig iron from speculative sources, including 10,000 tons understood to come from New York banking interests, is accepted as evidence of belief that prices have touched bottom. Some pig iron bought recently by brokers is being sold at concessions and a sale of 10,000 tons of basic by a steel company in western Pennsylvania was made below recent Valley quotations, but for the most part prices are firm and deliveries are going forward satisfactorily. A St. Louis buyer has asked for earlier shipment of 5000 tons bought for first quarter delivery. A Canton, Ohio, company has purchased 5000 tons of basic.

German No. 1 foundry pig iron, now at 116 gold marks per metric ton, is in American currency $28.05 per gross ton, comparing with $23.30 for British iron and $22.75, the foundry component for THE IRON AGE pig iron composite price.

Eastern plate makers are confronted by European competition. An Atlantic Coast ship and car builder finds a 2c., Pittsburgh, price necessary to meet a foreign mill quotation on 2700 tons of car plates. This is a big gap from the $2 a ton concession occasionally met from the 2.50c. price.

Hot-rolled flats and cold-rolled strips are well sold into the first quarter, and the steel bar market has been enlivened by a number of first quarter sales to makers of shafting and cold-finished bars.

Bolts, nuts and rivets give a sign of the changing price sentiment, Pittsburgh reporting more freedom of movement than when prices were lower.

Current demand in nails is sufficiently heavy to make it difficult to build up stocks for spring demand.

A Welsh £1,000,000 tin plate selling corporation has been formed, absorbing eight tin plate merchants, with the idea of wiping out the middlemen. It will handle the output of three or more of the large works.

For the South Manchuria Railroad 200,000 tie plates have been placed in the United States.

No change has occurred for several weeks in either of THE IRON AGE composite prices, the pig iron composite standing at $21.88, while finished steel is 2.775c. per lb. One year ago pig iron was $25.79 and finished steel 2.439c.; two years ago, $18.68 and 2.062c.

Pittsburgh

Marked Change for the Better—Sheet Orders Heavy—Tin Plate Prospects Bright

PITTSBURGH, Dec. 24.—The closing week of the year finds the steel industry in a cheerful mood, because the past ten days have been marked by an appreciable change for the better in business and there is increased evidence that consumers are abandoning ideas of lower prices in the near future. Sheet orders lately have been in the heaviest volume since the early part of the year and it is now expected that the December orders of independent makers will be close to, if not actually in excess of, 300,000 tons. The American Sheet & Tin Plate Co. also has felt the betterment, notwithstanding that its prices are somewhat above those of most independent producers.

It is doubtful whether tin plate prospects ever before were brighter than they are now. The leading producer is solidly committed against its maximum production over the first half of 1924 and the position of independent companies is almost as favorable. Incidentally, this year will establish a record production of tin plate, with an output of close to 40,000,000 boxes. Wire products are being booked in greater volume than recently. Makers of hot-rolled flats and of cold-rolled

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 24, 1923	Dec. 18, 1923	Nov. 27, 1923	Dec. 26, 1922
No. 2X, Philadelphia‡	$24.26	$24.26	$24.14	$28.76
No. 2, Valley furnace†	22.00	22.00	22.00	27.00
No. 2, Southern, Cin'ti†	25.05	25.05	25.05	27.05
No. 2, Birmingham, Ala.†	21.00	21.00	21.00	23.00
No. 2 foundry, Chicago*	23.00	23.00	23.00	28.00
Basic, del'd, eastern Pa.	23.25	23.25	22.75	26.75
Basic, Valley furnace	21.00	21.00	21.00	25.00
Valley Bessemer, del P'gh.	24.76	24.76	24.76	29.27
Malleable, Chicago*	23.00	23.00	23.00	28.00
Malleable, Valley	20.00	20.00	22.00	27.00
Gray forge, Pittsburgh	23.26	23.26	23.26	28.27
L. S. charcoal, Chicago	29.15	29.15	28.15	33.15
Ferromanganese, furnace	109.00	109.00	107.50	100.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. sheet bars, P'gh	42.50	42.50	42.50	36.50
Forging billets, base, P'gh.	45.00	45.00	45.00	42.50
O.-h. billets, Phila	45.17	45.17	45.17	43.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.35	2.35	2.35	2.00
Light rails at mill	2.25	2.25	2.25	2.10

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.62	2.62	2.67	2.275
Iron bars, Chicago	2.40	2.40	2.40	2.35
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	1.95
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.74	2.29
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.74	2.34
Steel hoops, Pittsburgh	3.00	3.00	3.00	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Dec. 24, 1923 Cents	Dec. 18, 1923 Cents	Nov. 27, 1923 Cents	Dec. 26, 1922 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	4.90	4.90	4.85	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$20.50	$20.00	$18.50	$24.50
Carwheels, Philadelphia	19.50	19.50	18.50	20.00
Heavy steel scrap, P'gh	19.00	19.00	16.50	20.00
Heavy steel scrap, Phila.	17.50	17.00	15.50	17.00
Heavy steel scrap, Ch'go	17.25	16.50	14.50	17.75
No. 1 cast, Pittsburgh	21.50	19.50	19.00	22.50
No. 1 cast, Philadelphia	21.00	20.00	20.00	21.00
No. 1 cast, Ch'go (net ton)	20.00	20.00	19.00	20.50
No. 1 RR. wrot. Phila.	19.00	18.50	18.00	20.00
No. 1 RR. wrot. Ch'go (net)	16.00	15.50	13.00	16.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.00	$8.00
Foundry coke, prompt	4.75	4.75	5.00	$150

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.25	13.25	14.75
Electrolytic copper, refinery	12.87½	12.87½	12.87½	14.50
Zinc, St. Louis	6.25	6.20	6.37½	6.95
Zinc, New York	6.60	6.55	6.72½	7.30
Lead, St. Louis	7.75	7.60	6.70	6.97½
Lead, New York	8.00	7.75	7.00	7.30
Tin (Straits), New York	47.30	47.25	47.00	39.00
Antimony (Asiatic), N. Y.	10.25	9.00	9.00	6.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 24, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Dec. 18, 1923,	2.775c.
Nov. 27, 1923,	2.775c.
Dec. 26, 1922,	2.439c.
10-year pre-war average,	1.689c.

Composite Price, Dec. 24, 1923, Pig Iron, $21.88 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Dec. 18, 1923,	$21.88
Nov. 27, 1923,	21.86
Dec. 26, 1922,	25.79
10-year pre-war average,	15.72

strips are now very well sold into the first quarter and the steel bar market has been enlivened by the placing of a number of first quarter contracts by the makers of cold finished steel bars and shafting. Plates have not caught the stride of the market yet and activity in structural shapes is in the form of requests for protection rather than in actual orders. Structural projects are coming up for bids in greater volume than for several months, however, and buying is expected to assume rather big proportions before the new year is very far advanced. Makers of pipe take hope from the improvement in the oil situation.

The formal order as distinct from the contract still is a favorite mode of buying in many lines, for there is no well defined belief in the minds of either buyers or sellers that higher prices are immediately ahead. Maintenance of present prices seems to be the chief aim of producers, because the memory of what happened to business as a result of the sharp price advances of last spring still is fresh in their minds. With buyers entertaining no serious thought of higher prices or the possibility of interruption to steel plant operations and shipments, it is natural they should be prone to place orders rather than contracts.

The appearance of two large speculative inquiries for steel making grades of pig iron, one for 10,000 tons, said to be for the account of New York bankers, encourages the notion that prices are as low as they are going to be for the present. Most recent transactions in these grades, however, suggest that the market is not yet solidified at current quotations.

The scrap market retains its strength, recent re-

ported purchases by the Steel Corporation for this district being confirmed, while independents, after balking at first, lately, with one or two exceptions, have bought and paid the higher prices. The fuel situation still is more favorable to buyers than producers. Whether there will be a strike or a suspension of the soft coal mines on April 1, with the expiration of the present agreement, should be gleaned from a meeting of the operators and mine union officials in Cleveland on Jan. 4.

Plant operations will be light in this and nearby districts this week in observance of the Christmas holidays. Most of the rolling mills suspended last Saturday at noon, not to resume until Wednesday.

Pig Iron.—Business of the past week has plainly reflected the proximity of the end of the year and the desire to avoid adding to inventories. The steel interest at Johnstown, in an effort to round out its first quarter schedule on merchant iron, has sold about 10,000 tons of basic iron at prices well under those named by Valley producers, but since the bookings are believed to have filled up that seller, the price ideas of the Valley furnace interests are undisturbed. There is a belief that steel-making irons, which shared only to a limited extent in the November wave of buying, will get going soon after the turn of the new year, this idea being based upon the improved business in finished steel and the fact that iron now is cheap in relation to scrap. Only small lots of foundry iron have been sold, but producers find no trouble in getting $22 for the base grade. More is asked by some makers, but no sales are reported at the higher figures. Sales of several lots of low phosphorus iron are pending and will probably be closed in the next ten days. Competition from Eastern furnaces is less than it has been on this grade and it is expected the business will go to the Valley producer who is quoting $29 for copper free iron. A recent sale of 3000 tons of standard malleable iron at $20, Valley furnace, probably removes all the standard iron available at a price so low.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	23.00
Gray forge	$21.50 to 22.00
No. 2 foundry	22.00 to 22.50
No. 3 foundry	21.50 to 22.00
Malleable	20.00 to 22.50
Low phosphorus, copper free	29.00 to 30.00

Ferroalloys.—Evidence of a tendency on the part of British producers of ferromanganese to meet the domestic price of $109, seaboard, has appeared. We note one sale in this district of 250 tons of British material at $110, but with a rebate of $1 a ton allowed if payment is made within 30 days. Considerable business has been done in domestic material, but it has been made up of numerous sales of small tonnages. The response of buyers to a price of $75, delivered, for 50 per cent ferrosilicon has not been all that could be expected and it is intimated that one large producer has been named more favorable terms. A very fair volume of 1924 ferrochromium business has been placed at 10c per lb. contained chromium, for the material of higher carbon content. Speigeleisen still is rather slow of sale despite the recent cut in prices. Prices are given on page 1751.

Semi-Finished Steel.—The market takes on more activity with the approach of the opening of the new year, and prices are becoming more clearly defined. Two large users of billets in this district have covered for their first quarter requirements, one taking 2500 tons a month and the other 10,000 tons a month, at $40, Pittsburgh. Sale of a round tonnage of slabs for first quarter delivery to a sheet maker also is noted at $40, Pittsburgh. Sheet bars still are priced at $42.50, Pittsburgh or Youngstown, by leading makers and apparently that is to be the price for the first quarter. Sheet makers are advising the mills of their probable first quarter requirements, but are not yet specifying very freely. Small sales of 1½-in. billets have been made at $42.50, Pittsburgh, by a Youngstown mill, but as a general rule the size extra over base for small billets is being waived. Forging billets are not very strong at $45, base, because they are to be had from more mills than usual. In times of rush and labor shortages a good many mills pass up forging steel business. Skelp is slow and untested and, while a good many rod contracts for first quarter shipments have been placed, specifications are light and current demands few. Base price on rods now applies to No. 5 to ⅜-in.; hitherto, rods coarser than ¼-in. commanded an extra of $2.50 a ton. Usually a size extra applies for fineness rather than coarseness; in the case of rods, it is stated that the bulk of rders are for No. 5 (0.207 in.) and change of roll for larger size involves extra expense. Prices are given on page 1751.

Iron and Steel Bars.—Some of the makers of cold-finished steel bars have entered contracts for their first quarter requirements of hot-rolled bars, but this tendency is not yet very pronounced either on the part of other makers of that line or the bolt, nut and rivet manufacturers. In the absence of signs of higher prices in the near future and with deliveries on orders very prompt, most consumers incline to the order instead of the contract and specification method of buying. A very fair volume of January shipment business is coming to makers and the regular price of 2.40c., base, Pittsburgh, is closely observed. Iron bars also are firm in price, but demand reflects the lack of railroad car buying.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Structural Material.—This market is taking on a more active appearance, not because local shops are getting many large awards, but because a veritable flood of inquiry is being figured against and there is much seeking of protection on the tonnages required. It cannot be safely predicted how much of the work upon which the drawing rooms are now busy will be let, but it is said that investors are not talking price as much as formerly and similarly in plain material, there seems to be more inclination to accept current prices as likely to hold. Prices are given on page 1750.

Plates.—Buyers still are pursuing a careful buying policy and are not anticipating their requirements. A fair number of small orders are coming out and on these less trouble than recently is experienced in obtaining the full price. Plate prospects for early 1924 are not considered very favorable locally, for there is little ship, car or tank building in sight at present. Railroad buying is expected to run heavier in 1924 to roads, bridges and terminals and the improvement in the oil market is expected to result in less demand for storage facilities. Prices are given on page 1750.

Wire Products.—Mills in this district have a good volume of January business against which to produce and ship. There is more inclination on the part of both manufacturing consumers and jobbers to enter contracts, but it is not as pronounced as usual, presumably because delivery against orders is prompt and there is nothing in sight just now to suggest higher prices in the near future. Movement of nails and of manufacturers' wire stands out. Efforts of manufacturers to build up stock of rails against the spring demand are not making much progress because current demands are so heavy. Local mills disclaim encountering price cuts except on coated nails, which can be bought from Middle Western mills at $2.60 per count keg, as against $2.70, the base price of mills here. Prices are given on page 1750.

Steel Rails.—Principal demand for light rails is originating in the anthracite regions and on account of freight disadvantages, mills in this district are not benefited. Glen Alden Coal Co., was a recent buyer of 2000 tons of light sections for delivery in the Wilkes-Barre district; this business is believed to have been placed with a rerolling mill, said to have an agreement with the Delaware, Lackawanna & Western Railroad, stockholders of which control the Glen Alden Co., to take its old rails and reroll them on a conversion basis. Billet rails still are priced at 2.25c.,

base, with rerolled sections available anywhere from 2c. down to 1.85c., base.

We quote light rails rolled from billets at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Hot-Rolled Flats.—Business has expanded materially in the past fortnight and with most makers now well committed against their probable first quarter production, prices are firmer than they have been. The market now is quotable squarely at 3c., base, for hoops, bands and strips, lower quotations having largely disappeared. Prices are given on page 1750.

Cold-Rolled Strips.—Makers have been getting liberal orders and contracts lately and while they are not entirely filled up for the first quarter, they are well sold into that period. Prices below 5c., base, have entirely disappeared.

Bolts, Nuts and Rivets.—These products are moving with more freedom at present prices than they did at lower figures. Much contracting for first quarter has been done, and with makers now comfortably filled, price cutting has ceased. Prices and discounts are given on page 1750.

Coke and Coal.—Despite the furnace coke contracts recently placed and the old ones which were renewed for first quarter, there is still considerable open capacity for that period and some uncertainty about prices. Business of this sort already concluded has been at prices ranging from $4.50 down to $4.25 per net ton at ovens on most of the tonnage, but one producer is reported to have gone as low as $3.75 on one piece of business involving 25,000 tons a month and on other business has named prices that will mean a general average of about $4. Spot furnace coke holds right around $4. Occasional sales are made of loaded cars at less, but an inquiry for production coke would hardly bring out a lower price than $4. Spot foundry grade holds at the recent range of from $4.75 to $5.50, while the contract market is quotable from $5.50 to $6.50. Coal prices reflect a light demand and ample supplies. Mine run steam coal is to be had at $1.90 to $2.10 from all mines except those supplying domestic requirements. Mine run coking coal ranges from $1.75 to $2 and gas holds at $2.25.

Tubular Goods.—Mills still are well provided with business in standard pipe, but are running out of orders for oil country goods and the fact that jobbers are taking inventories is causing some holding up of shipments of standard pipe for the remainder of this year. Specifications for January shipments of this class of goods are fairly heavy and the turn for the better in the oil situation is expected to bring about an increase in drilling programs with a consequent increase in the demand for pipe. Boiler tubes still are extremely dull, but there is a good market in mechanical tubing, largely as a result of the demands of the automotive industry. Prices are soft on boiler tubes, and special prices have been made to secure some big mechanical tube orders, but pipe prices are well maintained. Discounts are given on page 1750.

Sheets.—Demand still is expanding and it is now certain that the mills will start the new year with much heavier order books than seemed probable a few weeks ago. The fact that the end of the year is near is resulting in the release of much tonnage that had been held up to escape being included; there has been a notable increase in orders from jobbers and the automobile and parts makers are increasing their commitments. There is some contracting for first quarter, but the formal order still is the more popular method of purchase. Prices are strengthening as a result of the increased orders and while prices $2 per ton below the regular market quotations on black and galvanized sheets have not entirely disappeared, fewer makers than formerly will take business at the lower prices. Sales of blue annealed sheets below 3c., base, have practically disappeared. Most sheet mills suspended last Saturday at noon for the Christmas holidays. Prices are given on page 1750.

Tin Plate.—Mills have bookings sufficient to carry them at practically full capacity through the first half of 1924 and there already is some talk of a possible shortage before the end of that period, since announced plans of packers call for the largest pack of foods in the history of the industry and supplying the demand for cans for that purpose will probably mean little open tin plate capacity for other purposes for several months. The market is very firm at $5.50 per base box, Pittsbugh, for standard cokes. This year's production of tin plate is estimated at 40,000,000 boxes, a new high record mark.

Cold-Finished Steel Bars and Shafting.—The fact that a Chicago base has been set up by one mill in the Chicago district on this line has had seemingly no effect upon local prices nor upon the selling policies of local producers as to sales either in the Chicago district or in territory where the Chicago mill has an advantage of freight over Pittsburgh. All makers here still are quoting 3c., base, Pittsburgh, and equalizing freight with the Chicago mill in competitive territory. Much business is coming this way, even out of the Chicago district, although this means a Pittsburgh equivalent price of 2.66c., base. This is possible, however, only because some mills still have some low-priced steel bars and one company makes its own hot-rolled bars. Expanding programs of automobile companies is helping general business. Ground shafting is unchanged at 3.40c., base, f.o.b. mill for carloads or more.

Track Supplies.—Two local makers of spikes shared in the recent distribution of orders by the New York Central Lines and with a large Pennsylvania order pending, it is expected they soon will be comfortably fixed in the matter of backlog business. Depressed coal market keeps down the demand for small spikes. Prices show no special change. They are given on page 1750.

Old Material.—The report is confirmed that the Carnegie Steel Co. made an additional purchase of heavy melting steel at $19.50, the amount being placed at 10,000 to 20,000 tons, and as most of the independent companies in this and nearby districts have joined in the buying movement, paying $19 to $19.50, the market now is squarely quotable at that range. There has been a sharp advance in No. 1 cast, on a good-sized purchase by a large electrical company, and the market continues to exhibit marked strength on blast furnace grades. Steel foundries remain out of the market, and for that reason there has been no material stiffening in prices of knuckles, couplers, springs and other railroad specialties.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$19.00 to $19.50
No. 1 cast, cupola size	21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland Md.; Huntington, W. Va., and Franklin, Pa.	18.50 to 19.00
Compressed sheet steel	17.00 to 17.50
Bundled sheets, sides and ends	15.50 to 16.00
Railroad knuckles and couplers	20.00 to 20.50
Railroad coil and leaf springs	20.00 to 20.50
Low phosphorus blooms and billet ends	22.50 to 23.00
Low phosphorus plate and other material	21.50 to 22.00
Railroad malleable	18.50 to 19.00
Steel car axles	20.00 to 20.50
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	20.00 to 20.50
Machine shop turnings	14.50 to 15.00
Sheet bar crops	19.50 to 20.00
Heavy steel axle turnings	16.50 to 17.00
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	18.00 to 18.50
Stove plate	14.50 to 15.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	19.00 to 19.50

F. E. Cardullo, W. H. Lee and William Schaefer were elected directors of the Engineering Club of Cincinnati at the annual meeting held Dec. 19. Lieut. F. O. Carroll, McCook Field, Dayton, Ohio, spoke of the work of the engineers in the air service.

Chicago

Buying of Finished Steel Increasing—More Pig Iron Sales Than Expected

CHICAGO, Dec. 24.—Buying of finished steel, while not yet heavy, is improving and there are indications that consumers are tired of waiting for price reductions and have decided to buy against their first quarter requirements. The automotive interests have led the way with fairly liberal orders and other classes of users are expected to follow suit.

The building industry promises to take large quantities of steel, forcibly contradicting the opinion frequently expressed of late that construction activity is due for a decline. Lettings for the week aggregate nearly 8500 tons and active pending fabricated projects involve nearly 35,000 tons. Early action is expected on the Southern Pacific inquiry for 10,000 cars, but otherwise few car orders are in sight. It is possible that railroad car buying will not loom up as so large a factor in the market as was expected. The mills are well booked in rails and recent orders for track fastenings have been conspicuous.

Mill prices are firm and operations are substantially the same as a week ago, although most mills will shut down on Christmas Day in all except the continuous process departments.

Pig Iron.—The market is quiet, although spot sales have been somewhat heavier than had been expected. In some instances, melters underestimated their December needs when they closed for first quarter. A number of others have increased their orders for the first three months of next year. Holiday shutdowns of foundries are probably less general than is customarily the case. Malleable plants doing business with a leading automobile maker are especially pleased with heavy orders for castings recently placed. Prices are firm in what is understood as the Chicago territory, but in Michigan where Lake Erie furnace competition had to be met, an order for 500 tons of malleable for first quarter shipment was booked at $25 base, Chicago furnace. We note sales of 400 tons of Southern foundry at $21 base, Birmingham. The New York Central is inquiring for 600 to 800 tons of foundry for first quarter shipment to Elkhart, Ind.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal averaging sil. 1.50, delivered at Chicago..	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	$23.50 to 24.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	23.00 to 23.50
Malleable, not over 2.25 sil	23.00 to 23.50
Basic	23.00 to 23.50
High phosphorus	23.00 to 23.50
Southern No. 2	27.01
Low phos., sil. 1 to 2 per cent, copper free	34.79
Silvery, sil. 8 per cent	37.29

Ferroalloys.—Although there have been a few small sales of spiegeleisen recently at $39, furnace, the lowest present quotation is $40, furnace, or $48.58, delivered. Ferromanganese is held at $110, f.o.b. New Orleans or Baltimore. No sales are reported but several carlot inquiries are pending. Small lots of 50 per cent ferrosilicon for spot shipment have been sold at $75, delivered.

We quote 80 per cent ferromanganese, $117.56 to $118.38, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, $47.58 to $48.58, delivered.

Plates.—All bids are in on the Southern Pacific cars and awards are expected momentarily. This equipment will require fully 100,000 tons of plates, shapes and bars. The mills' principal hope for tonnage lies in car steel. Oil storage tank buying has ceased; orders from miscellaneous sources are few, although as the new year draws near there appears to be an increasing propensity to buy, particularly for quick shipment to replenish exhausted stocks. If inquiries are to be taken as a criterion, a good volume of buying should develop early in January.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Bars.—Jobbers and manufacturing users of soft steel bars are commencing to place their first quarter needs and while, generally speaking, mill bookings still fall short of shipments, there is less propensity on the part of the buyers to delay purchases in the expectation of lower prices. One local mill has booked orders for 12,000 tons, consisting mostly of bars, as well as some plates and shapes. Inquiries are increasingly numerous and purchases of small lots for quick shipment are encouraging in volume. The situation in bar iron and hard steel bars shows no appreciable change.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.45c.; bands, 3.95c.

Structural Material.—Building prospects grow brighter as the new year approaches. Bids will be taken on the Tribune Tower, Chicago, involving 11,000 tons, Jan. 15. Plans will be out early next month on the Lake Shore Athletic Club, Chicago, involving about 5000 tons. Figures will also be asked early next year on a new building to replace the present St. Luke's Hospital, Chicago, work which will require approximately 5000 tons. An extension to a boiler house for the Crane Co., Chicago, will take 700 tons. The assembly plant projected for the Ford Motor Co. at St. Paul, Minn., is being redesigned and will probably require 6000 tons. Lettings during the week comprise a number of good-sized tonnages. Among them are the Donaldson store building, St. Paul, 3500 tons; the Board of Trade Building, Kansas City, Mo., 1200 tons; and Great Northern bridge work, 950 tons. Mill prices are firm and unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Rails and Track Supplies.—Out of 75,500 kegs of track spikes placed by the New York Central, 20,000 were ordered from the Illinois Steel Co., 4500 from the Inland Steel Co. and 40,000 kegs were divided between the Jones & Laughlin Steel Corporation and Dilworth, Porter & Co., Pittsburgh. The New York Central's inquiry for 30,000 tons of tie plates has also resulted in orders, which have been distributed among Dilworth, Porter & Co., the Bethlehem Steel Co., the Sellers Mfg. Co. and the Illinois Steel Co. The road also bought 25,000 kegs of track bolts, placing the bulk of them with the Bourne-Fuller Co. at a reported price of 3.50c. mill. Sales of standard rails by local mills during the week aggregated 6000 tons. Most of this tonnage was placed by frog and switch manufacturers. In reviewing the entire year, it is estimated that fully 1,000,000 tons of standard rails were bought by roads served by Western mills. Part of this tonnage, particularly for roads running East from Chicago, went to mills in other districts, so that the total tonnage actually booked by Western producers probably ranges from 750,000 to 800,000. Sales for the country at large are estimated at more than 2,000,000 tons.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Bolts and Nuts.—Specifications are fairly good and contracts are being booked steadily as the first quarter approaches. The outstanding feature of the market, however, is the increasing firmness of discounts. Prices ruling in this district are those on page 1750, except that for Western delivery they are on a f.o.b. Chicago basis.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ⅞ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Sheets.—The attitude of practically all producers toward prices is notably firmer and concessions below the Steel Corporation figures are not only less frequent, but are confined almost entirely to tonnage for spot shipment. First quarter buying is proceeding at a better rate than had been expected during the holiday season, and some producers will soon be comfortably booked for the period. In fact, some observers are of the opinion that a scarcity market is not far distant.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.90c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Wire Products.—While business is coming in more freely for delivery after Jan. 1, no general buying movement has yet developed. The situation, however, is regarded as encouraging. Prices, which are firm, are shown on page 1750.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Cast Iron Pipe.—Bookings have been heavy and the price ideas of sellers are increasingly firm. The United States Cast Iron Pipe & Foundry Co. has taken 2000 tons for Cincinnati, 6500 tons for Denver, and 1800 tons for Toledo. The Grand Rapids Gas Co. has placed 1400 tons with the leading interest. The city of Omaha, Neb., is in the market for 3500 to 5000 tons. The National Cast Iron Pipe Co. is now bidder on 500 tons for New Holstein, Wis. Prices range from $47 to $48, Birmingham, on 6-in. and larger.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $59.20 to $60.20; 6-in. and above, $55.20 to $56.20; class A and gas pipe, $5 extra.

Reinforcing Bars.—Prospective business, much of it industrial work, is in promising volume, although in many instances the awarding of tonnage will not take place until some time after the first of the year. For the time being the price situation is unsteady and although sellers are trying to hold to 3c., Chicago warehouse, concessions have been made down to 2.75c. The latter figure has been rather commonly quoted on road work. The largest letting of the week, 800 tons for a grain elevator at Oswego, N. Y., was placed with the Kalman Steel Co. General contracts recently placed in Indiana for State highway work involve 1700 tons of bars which are expected to be bought shortly. Lettings include:

Grain elevator, Oswego, N. Y., 800 tons to the Kalman Steel Co.

Ford Motor Co. assembly plant, St. Paul, Minn., 175 tons to C. A. P. Turner Co.

Junior High School, South Bend, Ind., 200 tons to Truscon Steel Co.

Security Van & Storage Co., warehouse, Duluth, Minn., 130 tons to Kalman Steel Co.

Catholic Seminary, Area, Ill., 230 tons to American System for Reinforcing.

Pending work includes:

Indiana steel highway work, 1700 tons, general contracts awarded largely to Indiana contractors.

Harrison School, Grand Rapids, Mich., 400 tons.

Peabody Hotel, Memphis, Tenn., 1200 tons, rail steel specified.

Old Material.—Recent reports that the Steel Corporation had bought a substantial tonnage of heavy melting for Gary lack confirmation. The fact that one important local dealer has been making heavy purchases of melting steel at advancing prices has been interpreted as indicating that orders have been placed sub rosa or are momentarily expected. Outside of this, there is no evidence of any interest in steel by the leading producer. In fact, some observers doubt seriously that purchases will be made in view of the heavy scrap stocks at Gary, estimated as aggregating fully 200,000 tons. It is the general opinion, furthermore, that unless the mills do come to the support of the market, advances in prices cannot continue. Outside of liberal purchases of busheling and wrought by a local iron mill, consumer buying has been generally light. Railroad offerings include the Burlington, 7400 tons, and the Soo Line, 200 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$20.50 to $21.00
Cast iron car wheels	20.50 to 21.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Forged steel car wheels	20.00 to 20.50
Railroad tires, charging box size	20.50 to 21.00
Railroad leaf springs, cut apart	20.50 to 21.00
Rails for rerolling	18.00 to 18.50
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	17.25 to 17.50
Frogs, switches and guards cut apart	17.25 to 17.50
Shoveling steel	17.00 to 17.25
Drop forge flashings	12.00 to 12.50
Hydraulic compressed sheets	13.50 to 14.00
Axle turnings	14.00 to 14.50
Steel angle bars	19.00 to 19.50

Per Net Ton

Iron angle and splice bars	21.00 to 21.50
Iron arch bars and transoms	21.50 to 22.00
Iron car axles	26.00 to 26.50
Steel car axles	18.00 to 18.50
No. 1 busheling	13.50 to 14.00
No. 2 busheling	8.50 to 9.00
Cut forge	15.50 to 16.00
Pipes and flues	11.00 to 11.50
No. 1 railroad wrought	16.00 to 16.50
No. 2 railroad wrought	15.50 to 16.00
Steel knuckles and couplers	18.50 to 19.00
Coil springs	20.00 to 20.50
No. 1 machinery cast	20.00 to 20.50
No. 1 railroad cast	19.00 to 19.50
No. 1 agricultural cast	19.00 to 19.50
Low phos. punchings	16.50 to 17.00
Locomotive tires, smooth	17.50 to 18.00
Machine shop turnings	9.00 to 9.50
Cast borings	11.25 to 11.75
Short shoveling turnings	11.25 to 11.75
Stove plate	17.00 to 17.50
Grate bars	16.50 to 17.00
Brake shoes	17.50 to 18.00
Railroad malleable	18.25 to 18.75
Agricultural malleable	18.25 to 18.75

Merger Hearing at Buffalo Ended

BUFFALO, Dec. 24.—Hearings before the Federal Trade Commission on the Bethlehem-Midvale steel merger were adjourned Dec. 20. The commission conducted sessions in Buffalo for three weeks with Examiner George McCorkle. While no official announcement was made as to the location of the next hearings, it is understood the commission will resume at Washington early in January. The Buffalo hearings were not productive of any special testimony other than the lines followed in other cities where examinations were conducted.

Twelve new steel passenger coaches are being built for the Indianapolis & Cincinnati Traction Co. as a part of the new $800,000 equipment program of the company. Trucks for the new coaches are being built by the Baldwin Locomotive Works in Philadelphia and the bodies by the Cincinnati Car Co., Cincinnati. The Westinghouse Electric & Manufacturing Co., which originally equipped the road, has the contract for providing the motor air brake and control equipment for the 12 new motor passenger cars and four extra motors; for equipment for freight motor cars and for eight automatic substations, one semi-automatic substation and one portable automatic substation.

New York

Car Plates May Be Bought in England for Delivery on Atlantic Seaboard

NEW YORK, Dec. 24.—There is in the minds of some buyers an apparent belief that present finished steel prices will hold for first quarter as is evidenced by the purchase for early shipment of 3000 tons, mostly structural shapes, by a local jobber who is considered a careful buyer, and it is reported that the lowest price he was able to develop was 2.40c., Pittsburgh. On the other hand representatives of American plate mills have been informed that it would be necessary for them to quote 2c., Pittsburgh, on 2700 tons of car plates required by a shipbuilding and carbuilding works on the Atlantic seaboard to meet the competition of foreign mills. As no mill here was willing to go that low it was indicated today that the business would go abroad. THE IRON AGE cable from London in the issue of Dec. 20 showed that sheared plates are quoted in England at the equivalent of 1.86c. to 1.95c., f.o.b. works, while Ruhr plates were available at 1.51c. Even with ocean freight rates, plus insurance and duty, these plates, it is stated, can be delivered at points along the Atlantic Coast at prices much lower than plates from American mills on the basis of 2.40c., Pittsburgh. The demand for structural material continues strong, and while less new work has come out in the past week than in the week before it is plain that the lull is due to the holidays, much more tonnage being in sight that will come into the market within the next few weeks. Many of the offices of steel companies closed at noon on Monday and there was little business transacted.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Ferroalloys.—Numerous inquiries continue to appear, the total aggregating about 2000 tons, all for delivery next year. There have been sales at both the domestic price of $109 and the British price of $110, seaboard, one put at 1000 tons. There have been sales of several carload lots of spiegeleisen at $40, furnace, and there has been a fair amount of inquiry. Contracts for 50 per cent ferrosilicon for next year's consumption continue to be negotiated at $75, delivered, but details are lacking. The same is true of ferrochromium, but it is understood that the price is about the same for 1923.

Pig Iron.—As the old year draws to a close, the most encouraging feature of the market from the standpoint of the seller is the fact that while few requests to defer shipments are being received, most melters are taking the iron when it is due them and some are requesting anticipation of shipments. This would indicate that at least fair activity of foundries may be expected after the troublesome inventory period has passed. The Worthington Pump & Machinery Corporation, which has been in the market for about 2000 tons, is understood to have found conditions firmer than had been expected and is awaiting further developments. The Ingersoll-Rand Co. has purchased 500 tons of malleable iron, but no other sale in excess of 200 or 300 tons has been reported. Recent sales have, however, aggregated a fair tonnage, one company having disposed of nearly 7000 tons during the past week. Prices are firm so far as furnaces are concerned at $22, Buffalo, and $23 eastern Pennsylvania, but some speculative iron can be had at slightly lower figures.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.27
East. Pa. No. 2, sil. 1.75 to 2.25	25.27
Buffalo, sil. 1.75 to 2.25	26.91
No. 2X Virginia, sil. 2.25 to 2.75	30.44
No. 2 Virginia, sil. 1.75 to 2.25	29.94

Warehouse Business.—Very little activity is noted this week, business having quieted down during the holiday season. Despite the dullness expected until after Jan. 1, some warehouses report that December may prove to be a better month for volume of business than November. Prices are firm, even black and galvanized sheets showing more strength. The pipe market is quiet and prices unchanged. We quote prices on page 1768.

Cast Iron Pipe.—The market shows no developments of importance. Business continues active despite what is usually the dull season for business. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Purchasing of soil pipe has declined, but foundries are fairly well filled with orders. The last week of the year sees curtailment of production for purpose of inventory and equipment repairs. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 29½ to 35¾ per cent off list; heavy, 39½ to 45¾ per cent off list.

Coke.—Quotations are unchanged and a fair demand, despite the current dullness of business, continues. Standard foundry coke is firm at $5.25 to $6.25 per ton and standard furnace at $4 to $4.50 per ton. By-product is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—Prices continue firm with an upward tendency in an extremely quiet market, induced by the holidays. Heavy melting steel is strong at $16.50 per ton for No. 1 grade delivered eastern Pennsylvania consumers with railroad quality at $17 per ton delivered. Specification pipe continues going forward to Milton and Lebanon, Pa., consumers at $16 per ton delivered. Stove plate is firm at $16.50 per ton delivered either at Harrisburg, Pa., or to West Mahwah, N. J. Clean cast borings have been bought delivered eastern Pennsylvania at $15.50 per ton and machine shop turnings are quotable at about $14.50 per ton delivered to points in eastern Pennsylvania. A fair degree of activity in shipments of borings and turnings from New England sellers to the Pittsburgh district is reported. Forge fire is firm at $14 per ton and better, delivered eastern Pennsylvania.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.50 to $13.00
Steel rails, short lengths, or equivalent	13.75 to 14.25
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	16.00 to 17.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	13.50 to 14.00
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (clean)	10.00 to 10.50
Machine-shop turnings	10.50 to 11.00
Mixed borings and turnings	9.00 to 9.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.00 to 12.50
Stove plate	12.50 to 13.50
Locomotive grate bars	12.50 to 13.00
Malleable cast (railroad)	14.00 to 15.00
Cast-iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00
No. 1 heavy cast, not cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	16.00

Buffalo

Feeling of Optimism Prevails as the Old Year Nears End

BUFFALO, Dec. 24.—The year will be brought to a close with the pig iron producers all in possession of satisfactory backlogs and a general feeling of optimism. Sales and inquiry are extremely light; less than 4000 tons has been sold. One interest, which did not make the drastic price advances following the buying movement and trailed along for several weeks, has reached the same policy as district competitors within a few days and is now on a $23 base schedule. This practically puts the entire group of sellers on a more uniform price basis than has been sustained since the beginning of the November buying movement. With the exception of one inquiry for 1000 tons, no large tonnages are engaging attention. Such inquiries as are now in hand are for small, scattered tonnages.

There is a disparity with reference to differentials. One furnace is asking one dollar differential on higher silicons, but it is easy to buy at differentials of 50c.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$23.00
No. 2 foundry, sil. 2.25 to 2.75	22.50
No. 2 plain, sil. 1.75 to 2.25	22.00
Basic	22.00
Malleable	22.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Notwithstanding holiday inactivity, demand for bars and sheets has been fairly satisfactory. Bar prices hold, but sheet prices are being shaded for prompt shipment business. These concessions are not being made for delivery over the first quarter.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Old Material.—Inventories show the lowest stocks of old material in years. Practically every consumer has permitted his stock piles to drop almost to the point of exhaustion and this is taken as an indication of a lively demand for heavy melting steel and other products early in January. Sales of steel this month will engage attention all through January.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$17.50 to $18.00
Low phos., 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	18.00 to 18.50
Machine shop turnings	10.00 to 11.00
Cast iron borings	12.50 to 13.00
No. 1 busheling	14.00 to 15.00
Stove plate	17.00 to 17.25
Grate bars	16.00 to 16.50
Bundled sheet stampings	10.00 to 11.00
Hydraulic compressed	14.00 to 14.50
Railroad malleable	19.50 to 20.50
No. 1 machinery cast	19.50 to 20.50

St. Louis

Request for Early Shipment of 5000 Tons Ordered for First Quarter

ST. LOUIS, Dec. 24.—The usual holiday lull prevails in the pig iron market. There were no inquiries of note during the week, and sales were light, and were confined to small lots for prompt shipment. One of the recent heavy purchasers of pig iron asked for shipment of 5000 tons before the end of the year on account of its first quarter contracts. On the other hand, there has been some request to delay shipment until after the first of the year on some of the purchases that were made for prompt shipment, this being done to lighten inventories. Foundries catering to the railroad trade report a decrease of orders. The market price of $23 to $23.50 Chicago, and $21 Birmingham still prevails, with the St. Louis Coke & Chemical Co. quoting $25 to $26 Granite City.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$25.16 to $25.66
Northern malleable, sil. 1.75 to 2.25	25.16 to 25.66
Basic	25.16 to 25.66
Southern fdy., sil. 1.75 to 2.25 (rail)	26.17

Finished Iron and Steel.—The only activity reported is in material for tin plate manufacturers, who have placed some contracts for first quarter. Other manufacturers using steel products are holding off to see what the new year will bring forth in the way of orders. Their stocks are low, and they will need material for what orders they get. Warehouse business is dull. No new railroad inquiries are reported.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, ¾-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—A few scattering orders tell the whole story of the coke market. The weather has been too warm to create much of a demand for domestic grades. The dealer is too well stocked to place any orders for additional supplies. Industrial grades are dull. The weather has been too warm, for one thing, to warrant fires in plants.

Old Material.—Prices of old material continue to shoot upward, advances during the week ranging from 50c. to $1.50 a ton. It still is a dealers' market. They still live in hopes of heavy buying by consumers after the first of the year and have been bidding high prices for material offered in railroad lists. An unusual circumstance attending the bidding for railroad material is the entry into the market of consumers themselves. Dealers learned of this and outbid the consumers. This means virtually that the consumers have bid up prices on material they ultimately must buy. The only new railroad list of the week was issued by the Chicago & Alton, 1000 tons.

Per Gross Ton	
Iron rails	$17.00 to $17.50
Rails for rolling	18.50 to 19.00
Steel rails, less than 3 ft.	20.00 to 20.50
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 and over	32.50 to 33.50
Cast iron car wheels	19.50 to 20.00
Heavy melting steel	17.50 to 18.00
Heavy shoveling steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.50 to 18.00
Railroad springs	19.50 to 20.00
Heavy axles and tire turnings	14.00 to 14.50
Per Net Ton	
Steel angle bars	16.00 to 16.50
Steel car axles	19.00 to 19.50
Iron car axles	26.00 to 26.50
Wrought iron bars and transoms	20.00 to 20.50
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	15.50 to 16.00
Cast iron borings	11.50 to 12.00
No. 1 busheling	14.50 to 15.00
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	16.50 to 17.00
Machine shop turnings	10.50 to 11.00
Champion bundled sheets	10.00 to 10.50

Birmingham

Lull in Buying of Pig Iron Is Not Expected to Be Prolonged

BIRMINGHAM, ALA., Dec. 24.—The lull in the Southern pig iron market promises to be over shortly, as it is expected that the melters who have been buying from hand to mouth will begin again this week. Iron quotations are still on a base of $21 per ton, No. 2 foundry. It was expected that there would have been an advance by this time. The Alabama Co. and the Woodward Iron Co. are pushing improvements on a furnace each. The amount of iron sold for delivery during the first three months of the year and the business expected will warrant operation of not only the furnaces now in operation but two or three others. The Shelby Iron Co., manufacturer of charcoal iron, is making preparations to start its Shelby furnace in January. A little of its product is still on the yards. The surplus iron on yards in Alabama has been brought down to less than 80,000 tons, including basic.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$21.00
Basic	21.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—Lettings were received by all three of the pressure pipe makers in this district during the past week and shipments have been steady. Unanimous reply to questions as to state of business and prospects is that there is warrant for steady operation for some time.

4-in. water, $51; 6-in., $47; larger sizes, $46; 4-in. gas, $56; 6-in., $52; standard sanitary pipe, $55; heavy gage, $45.

Coke.—The coke market continues slow though introduction of the commodity as a domestic fuel in various sections of the country and at home is proving profitable. Foundries and other plants using coke are not contracting far ahead. Prices are as low as they have been in years, $5 to $6 for by-product coke.

Old Material.—The scrap iron and steel market has tapered off almost to nothing except where there is selling at lower prices than those given. The published list of the past two weeks is continued. Purchases of old material have been limited in tonnages. The rest of the month promises to be quiet in this line. All yards of dealers in old material are well supplied. Railroads have been offering a large quantity of scrap and some dealers have been taking advantage of the opportunity to get in the product at a low quotation.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$16.00
Heavy melting steel	12.00
Railroad wrought	14.00
Steel axles	17.00
Iron axles	20.00
Steel rails	13.00
No. 1 cast	18.50
Tram car wheels	15.50
Car wheels	15.00
Stove plate	14.00
Machine shop turnings	6.00
Cast iron borings	8.00

Boston

Pig Iron Business Has Dropped Off—Scrap Market More Active

BOSTON, Dec. 24.—Business in pig iron has dropped to small proportions. Eastern Pennsylvania $22.50 furnace base iron seems to be out of the market, $23 now being the general price. A New York furnace, however, with a $3.65 freight rate into New England, is offering No. 2X at $22.50 furnace, or $26.15 delivered, and one Buffalo furnace heretofore on a $23 base is now openly quoting $22 furnace, or $26.91 delivered, with 50c. differentials. Buffalo resale No. 2X is still available at $26.91 delivered, No. 1X at $27.91 to $28.41, and No. 2 plain at $25.91. The market for Northern irons therefore is not as firm as is that for other irons. The situation insofar as Virginia and Alabama irons are concerned remains unchanged. Foundries are buying such irons only for mixture purposes and then in a small way.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$27.15
East. Penn., sil. 1.75 to 2.25	26.65
Buffalo, sil. 2.25 to 2.75	$26.91 to 27.41
Buffalo, sil. 1.75 to 2.25	25.91 to 26.91
Virginia, sil. 2.25 to 2.75	30.42 to 32.42
Virginia, sil. 1.75 to 2.25	29.92 to 31.92
Alabama, sil. 2.25 to 2.75	31.10
Alabama, sil. 1.75 to 2.25	30.60

Coke.—New England by-product foundry coke makers are securing more shipping instructions on 1923 contracts than they did earlier in the month, and there also has been some belated buying for first half, 1924 requirements. The demand for crushed coke has improved as well, consequently the position of the oven owners is more secure than a fortnight ago. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to quote $12.50 delivered in New England for foundry coke. Little Connellsville coke is offered in this territory.

Old Material.—Although not active, the market for old material is more so than it has been in many months. Buying is confined almost wholly for shipment to eastern Pennsylvania and prices average 50c. a ton higher than a week ago. The tonnage of heavy melting steel moved out of New England the past week has run well up into four figures, and several hundred tons have gone to a Worcester, Mass., steel plant. Most transactions in machine shop turnings have been at $10 on cars at shipping point. One lot of chemical borings was taken at $12, but that figure is above average prices quoted. Mixed borings and turnings early in the week were secured at $8.50, but the market today is easily 50c. higher than that figure. Forged scrap and bundled skeleton both have sold at $10 more frequently than at a smaller price. The Bancroft & Martin Rolling Mill, Portland, Me., offers $19 delivered for shafting, but little material is available at that figure. The Charlestown Navy Yard, Boston, during the past week sold among various materials, approximately 1,000,000 pounds of ship plate at $1.20½ per 100 lb. Second high bid was $1.20. A Chelsea, Mass., dealer bought the lot. At the Watertown Arsenal, Watertown, Mass., 260 tons of armor plate billets sold at .612c. per lb.; 220 tons of angles at .536c., and a round tonnage of pump carts at .73c.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plates	16.00 to 16.50
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$13.00 to $13.50
No. 1 railroad wrought	13.50 to 14.00
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1-in. in diam., over 2 ft. long)	11.00 to 11.50
Machine shop turnings	9.50 to 10.00
Cast iron borings, chemical	10.50 to 11.00
Cast iron borings, rolling mill	9.50 to 10.00
Blast furnace borings and turnings	9.00 to 9.25
Forged scrap and bundled skeleton	9.00 to 10.00
Shafting	17.00 to 17.50
Street car axles	17.00 to 17.50
Rails for rolling	13.50 to 14.00

Philadelphia

Slightly More Inquiry for Steel Products for First Quarter with Prices Firm

PHILADELPHIA, Dec. 24.—Indications multiply that consumers of steel are giving less thought to the possibility of further softening of prices. Some first quarter contracts are being placed, particularly for billets, blue annealed sheets, hot-rolled strips and bands. The large tonnages of structural steel placed on mill books within the past few weeks have encouraged that branch of the steel industry, and in some quarters propositions at less than 2.50c., Pittsburgh, for shapes are less likely to be entertained.

Most of the Eastern plate mills will be shut down all of this week and will not resume before the first of next week. Yet the plate mills have operated at a better rate in the past week than in any week in the past month. They have, however, cleaned up all of the tonnage on their books and will try to accumulate more orders before resumption. Plate inquiries are slightly more numerous and there are a few good-sized tonnages in prospect, a situation that has not existed recently.

Pig iron is quiet, but the scrap market shows a fair degree of activity with prices continuing to strengthen.

Pig Iron.—No business of importance in pig iron has been transacted in this district in the past week excepting one lot of 700 tons of copper bearing low phosphorus iron, which went at $28, furnace. The demand for foundry grades has been almost nothing, while in basic there has been no inquiry. Foundry iron remains firm at $23, base, furnace, with 50c. differentials for silicon content higher than 1.75 to 2.25 per cent. It seems probable that Eastern trunk line railroads will reduce the freight rate on pig iron from Buffalo furnaces to Boston rate points from $4.91 to $4.90, leaving the rate from eastern Pennsylvania furnaces unchanged. The Everett furnace went out of blast last Friday.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.76 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. 1X	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	23.25 to 23.50
Gray forge	23.00 to 23.50
Malleable	24.25 to 24.50
Standard low phos. (f.o.b. furnace)	27.50 to 28.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—An Eastern steel company last week bought 1000 tons of ferromanganese for the first four months of 1924 at $109, furnace. This seems to have established the market firmly at that figure as a minimum, while British ferromanganese is still quoted

at $110, seaboard. One domestic producer quotes $115, furnace.

Semi-Finished Steel.—A few contracts for open-hearth rerolling billets, none involving more than 500 tons, have been made at $40, Pittsburgh, and this seems to indicate that the purchasers do not expect any further weakening in finished material prices. A lot of forging billets is under negotiations for first quarter at $45, Pittsburgh.

Light Rails.—The Glen Alden Coal Co. has placed an order for 2000 tons of light rails.

Plates.—Some of the Eastern plate mills are shut down all of this week and will probably resume Dec. 31 or Jan. 2. Last week's operations were at a fairly good rate, but all of the tonnage on mills' books was rolled and the mills hope to accumulate enough new business within the next week for resumption of rollings. A few thousand tons for penstock and gas holder work are under negotiation and may be placed soon. The United Gas & Improvement Co. is figuring on construction of three gas holders which will require about 1000 tons. Penstock work, on which contractors are bidding, will require 1000 tons. These are larger tonnages than have recently come into the market and have created a slightly more hopeful feeling among the companies' rolling plates. Prices are unchanged at 2.40c. to 2.50c., Pittsburgh, with reports of 2.35c. occasionally being quoted on some of the more desirable business.

Structural Steel.—The Pennsylvania Railroad has awarded 5000 tons of steel for a new bridge at Sunbury, Pa., to the Bethlehem Steel Co. The leading independent structural steel mill in the East has recently accumulated a very satisfactory backlog and other mills have shared to a lesser degree in the recent heavy contracting for building construction. Although it is still possible to obtain quotations of 2.35c. to 2.40c., Pittsburgh, there is in some quarters less inclination to go below 2.50c. on new work. If the bookings of the past few weeks are duplicated during the next few weeks Eastern mills will have a satisfactory outlook for first quarter.

Bars.—The steel bar price remains firm at 2.40c., Pittsburgh. Very little contracting for first quarter has been done by consumers and jobbers, but the stocks of the latter are admittedly low and some buying from this source may appear shortly after the first of the year. A little better demand for bar iron has been stimulated by the recent reduction by Eastern mills to 2.30c., Pittsburgh.

Sheets.—Several first quarter contracts for blue annealed sheets at 3c., Pittsburgh, have been booked by the leading independent maker of this district. Black and galvanized sheets are quoted at 3.85c. and 5c., respectively, by most of the larger producers but concessions from these prices are still offered by some mills, particularly when early specifications can be procured.

Warehouse Business.—Local jobbers are encouraged by the fact that demand for steel out of stock has continued at a very good rate right up to the Christmas holidays. Jobbers' stocks are running low and replenishment will undoubtedly be in order after Jan. 1. Prices continue unchanged, for local delivery being as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Coke.—Blast furnace coke for shipment before Jan. 1 is available at $3.85 to $4, Connellsville, while first quarter contracts are offered at $4.40 to $4.50. Foundry coke ranges from $4.75 to $5.50, ovens.

Old Material.—Inquiries for steel scrap from Europe have come to Philadelphia dealers within the past week, definite offers having been made by steel manufacturers in England, France, Italy and Spain, while German interests have inquired without making any definite offers. Not more than $20, c.i.f., has been offered by any of the steel makers in the four countries first named, and in view of the increasing strength of the steel scrap market here it is doubtful whether any business will be negotiated at present. Fully 100,000 tons, it is stated, could be sold for shipment abroad if prices could be quoted that would meet the views of buyers abroad. One mill, alone, in England would take 50,000 tons. Demand for scrap from consumers in eastern Pennsylvania continues at a fair rate, with no large purchases during the past week. Prices, however, continue to strengthen. It would be difficult for a consumer to buy steel scrap under $17.50, deliverd, though brokers have picked up a little tonnage to apply on recent orders at slightly under this figure. Several grades, both for steel making and foundry use, have moved up 50c. and $1 a ton within a week.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel		$17.50
Scrap rails		17.50
Steel rails for rolling	19.00 to	19.50
No. 1 low phos., heavy 0.04 and under	22.00 to	23.00
Couplers and knuckles	20.00 to	21.00
Cast-iron car wheels	19.50 to	20.00
Rolled steel wheels	20.00 to	21.00
No. 1 railroad wrought	19.00 to	19.50
No. 1 yard wrought	17.50 to	18.50
No. 1 forge fire		15.00
Bundled sheets (for steel works)		15.00
Mixed borings and turnings (for blast furnace use)	12.00 to	13.00
Machine shop turnings (for steel works use)		15.00
Machine shop turnings (for rolling mill use)	15.00 to	15.50
Heavy axle turnings (or equivalent)	15.50 to	16.00
Cast borings (for steel works and rolling mills)	14.00 to	14.50
Cast borings (for chemical plants)	15.00 to	16.00
No. 1 cast	21.00 to	22.00
Heavy breakable cast (for steel plants)	18.00 to	19.00
Railroad grate bars	17.00 to	18.00
Stove plate (for steel plant use)	17.00 to	18.00
Railroad malleable	18.50 to	19.00
Wrought iron and soft steel pipes and tubes (new specifications)	17.00 to	17.50
Shafting	24.00 to	25.00
Steel axles	23.00 to	24.00

Cleveland

Buyers of Finished Material Show Belief Prices Will Not Decline

CLEVELAND, Dec. 24.—Considerable additional business in first quarter contracts came out during the week, largely in steel bars and strip steel. The bar contracts were placed at the regular 2.40c. price. This business indicates confidence on the part of buyers that present prices will hold. Current orders for small lots of steel bars also show an improvement. Some fair sized orders for rail steel bars were placed by tool manufacturers at concessions of from $2 to $3 a ton from the soft steel bar price. The demand for plates, which has been light for some time, shows an improvement. Some new inquiry for good sized lots has come from tank shops. There is still a range in plate prices from 2.40c. to 2.50c. Automobile companies placed considerable tonnage of hot-rolled strip steel either in the form of contracts or blanket orders at 2.90c. While this price is still available for desirable lots, the market is firmer and some mills that are comfortably filled for the first quarter are holding to 3c. The 2.90c. price is being shaded for wide strip that comes in competition with plates and skelp. The hoop and band market has not been tested since the attempt was made to hold the price at 3c. The New York Central Railroad will take bids Dec. 28 for its steel requirements for the first quarter, including steel bars, plates, structural material, sheets and various

other products, quantities required not being specified in its inquiry. Structural inquiry is light but considerable work is pending which is likely to be carried over into next month. Two or three lake boats are also pending.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Iron Ore.—Stocks of Lake Superior ore at docks and furnace yards were over 1,000,000 tons lower on Dec. 1 than on the same day last year, being 42,836,466 tons as compared with 44,004,201 tons on the same day a year ago and with 41,042,399 tons on Nov. 1. The amount on hand at furnaces Dec. 1 was 34,079,961 tons. Consumption of Lake Superior ore in November amounted to 4,441,477 tons, a decline of 359,094 tons from October. This compares with 4,380,996 tons consumed during November, 1922. Interior furnaces in the central district in November consumed 2,214,575 tons, a decline of 191,230 tons. Lake front furnaces including Canadian furnaces, used 1,867,707 tons, a decline of 171,186 tons and Eastern furnaces consumed 225,481 tons, a gain of 2100 tons over October.

Pig Iron.—The United Alloy Steel Corporation, Canton, Ohio, has purchased 5000 to 6000 tons of basic iron for the first quarter. This is understood to have been placed with a nearby furnace having a lower freight rate than from the Valley district at $21. J. B. Clow & Sons are inquiring for 6000 tons of pipe making iron for their Newcomerstown and Coshocton, Ohio, plants for the first quarter. With these exceptions very little activity developed during the week, although one producer sold 2000 tons of foundry and malleable iron in lots of 500 tons and under for the first quarter. One consumer who recently purchased 1000 tons of foundry iron is now inquiring for 500 tons additional for the first quarter. Prices are firm and unchanged. The common quotation of lake furnaces is $22.50 for foundry and malleable iron, which is firmly held for Cleveland delivery. For shipment to some points, a lake furnace is quoting $23. In the Valley district, quotations on foundry iron range from $22 to $22.50. Some consumers have held up pig iron shipments until after inventories, but on the other hand a few foundries have asked furnaces to anticipate shipments on first quarter contracts.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.00
Northern No. 2 fdy., sil. 1.75 to 2.25	23.00
Southern fdy., sil. 1.75 to 2.25	27.00
Malleable	23 00
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	$29.00 to 30.00

Semi-Finished Steel.—Some additional business was placed during the week. The leading local producer is virtually sold up for the first quarter and has withdrawn from the market. While this interest has taken some sheet bar business at $42.50, most of the contracts for sheet bars and all the billet and slab business was taken subject to trade paper quotations at time of shipment.

Sheets.—A good volume of sheet business was booked during the week, largely in body sheets from the automotive industry. Some buyers placed first quarter contracts and others bought only for January shipment. Prices on these are generally holding to 5.35c. The market on other grades shows an increasing firmness, although both black and blue annealed sheets can be bought at a concession of $2 a ton from regular prices for prompt shipment.

Reinforcing Bars.—Owing to the open winter, the demand for reinforcing bars continues fairly active. Soft steel reinforcing bars are commonly quoted at 2.30c. Rail steel bars are unchanged at 2.10c.

Coke.—The spread in prices has narrowed somewhat on Connellsville foundry coke, which is now quoted at $5 to $6.50 for standard grades for prompt shipment. A moderate volume of business is being placed in first quarter contracts at $6.25 to $6.50.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers have covered a large share of their trade with first quarter contracts at regular prices which are firmly maintained, and some consumers are placing current orders for shipment early in January to fill in their depleted stocks. Prices are firm at regular quotations. Many rivet consumers are placing first quarter contracts, which will be closed at the regular 2.90c. price. Current business is light.

Old Material.—Some additional purchases of scrap in round lots were made during the week, mostly by Valley district mills. The market has now quieted down although there is considerable activity among dealers who are covering against their recent sales. Mills have paid $19 for heavy melting steel and possibly a little higher, as that price in some cases has been offered by dealers. Compressed steel is being purchased by dealers at $17 for Valley delivery. Sales of borings and turnings to a Cleveland consumer are reported at $14.50. The market is very firm and prices have further advanced about 50c. a ton on most grades.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.75 to $17.00
Rails for rolling	17.50 to 18.00
Rails under 3 ft	17.50 to 17.75
Low phosphorus melting	19.50 to 20.00
Cast borings	13.50 to 14.00
Machine shop turnings	13.00 to 13.25
Mixed borings and short turnings	13.75 to 14.00
Compressed sheet steel	14.75 to 15.00
Railroad wrought	15.00 to 16.00
Railroad malleable	20.00 to 20.50
Light bundled sheet stampings	12.00 to 12.25
Steel axle turnings	14.50 to 15.00
No. 1 cast	21.00 to 22.00
No. 1 busheling	13.25 to 14.00
Drop forge flashings	13.25 to 13.50
Railroad grate bars	18.00 to 19.00
Stove plate	18.00 to 19.00
Pipes and flues	13.50 to 13.75

The new Union Trust Building, Cleveland, will shortly become one of the most important centers in the iron and steel, iron ore and lake shipping industry in that city. The Cleveland-Cliffs Iron Co. and J. F. Corlett & Co., steel sales agents, will move from the Rockefeller Building to the Union Trust Building, Jan. 1, and other companies that will become tenants in the same building a month or two later will include Pickands, Mather & Co., Bethlehem Steel Co. and the Youngstown Sheet & Tube Co. The Jones & McLaughlin Steel Corporation and Lake Superior Iron Ore Association have already moved into the new building.

Cost of Living Higher

Figures prepared by the National Industrial Conference Board show that the cost of living of the average wage earner was higher in November than at any previous time within the past two years. It is placed at 65.3 per cent above the 1914 figure, the principal increase during the month being in rent, which now stands 80 per cent higher than pre-war. Increases occurred also in food and sundries, while decreases were recorded in clothing, fuel and light. Compared with July, 1914, the purchasing value of the dollar is now figured at 60.5c.

A survey of the expense involved in the upkeep of automobiles used by salesmen will be made by a committee of the Sales Managers' Bureau of the St. Louis Chamber of Commerce. The object of the survey is to get information which may be used by all sales executives in determining amounts allowed salesmen for cars used in their daily business. It is hoped that a general inquiry into the practices of many firms will disclose principles which will prove of value in adjusting this item of salesmen's expense accounts.

Cincinnati

Moderate Buying of Pig Iron—Sale of 2500 Tons of Southern in the East

CINCINNATI, Dec. 24.—The pig iron market is dull, but not any more so than usually is the case at this season of the year. Orders generally run from carload lots to 200 tons. An Indiana melter closed on 500 tons of Northern last week, dividing the order between three furnaces on the basis of $22.50, Ironton. Some sales of Southern iron were made on a basis of $21, and an Eastern melter is reported to have placed an order for 2500 tons at this price. Inquiries are light, one from central Ohio calling for 200 tons; there is little inquiry for basic, Bessemer or silveries and prices are holding to schedules. Ferroalloy contracts for next year's requirements are being negotiated in fair numbers. The pig iron melt in this district shows little diminution and in fact some sections report orders for castings more numerous.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.77
Basic Northern	24.77
Malleable	24.77

Finished Materials.—There is a much better demand current for finished materials of all kinds, and during the past week some fair-sized orders were placed. First quarter contracts were also negotiated for substantial tonnages of bars, shapes and plates, while wire products have also shown noticeable activity. Prices generally are stiffening in that mills which had been shading prices for December shipment are now quoting regular prices for first quarter. This is especially noticeable in bolts and nuts, and first quarter contracts were placed in fair volume at the regularly quoted prices.

Reinforcing Bars.—A number of small projects were placed during the past week, involving a fair aggregate tonnage. A number of new projects are scheduled to come up for bids shortly after Jan. 1. Prices generally are unchanged at $2.20 for rerolled bars to $2.40 for bars from new billets.

Structural Activity.—A warehouse building for the L. & N. Railroad, at New Orleans, involving 1300 tons, is up for bids. The same road is taking bids on a shop at Etowah, Ala., for which about 450 tons will be required. A highway bridge over the Eel River, in Indiana, up for bids, calls for 220 tons. The building situation is promising in this distrct, and contractors expect a rush of inquiries following the turn of the year.

Sheets.—First quarter contracts are being placed for sheets and current business for immediate shipment is also improving. Prices are stiffening, less being heard of concessions being offered by the smaller mills.

Warehouse Business.—Cold-rolled steel has been reduced $3 per ton, following reductions made by warehouses in Chicago and Indianapolis. Orders are coming through slowly, but this condition is natural to the holiday period, and no significance is attached to it.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.10c.; cold-rolled flats, squares and hexagons, 4.60c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.50 per keg base; cement coated nails, $3.30 per keg.

Coke.—There is little activity in coke of any kind. Prices are unchanged from last week, though a firmer tendency is noted. We quote:

Connellsville furnace, $4.00; foundry, $4.50 to $5.00; New River foundry, $10.00 to $11.00; Wise County furnace, $4.75 to $5.25; foundry, $5.75 to $7.00; by-product foundry, $8.00, Connellsville basis.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. was the only bidder on 10,000 ft. of 10- and 16-in. pipe for the City of Cincinnati. The bid was $16,000 below the estimate, being for $94,165.50.

Old Materials.—There is little activity in the local market as far as sales to consumers are concerned, but dealers are still buying heavily, and as a result prices continue to advance. The market is at least 50c higher than last week, with offers of $15.50 for heavy melting steel finding no sellers. We note one sale of heavy melting steel to a dealer at $18.50, delivered to a point having a freight rate of $2.40 from Cincinnati.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$11.50 to $12.00
Iron rails	15.00 to 15.50
Relaying rails, 50 lb. and up	29.00 to 29.50
Rails for rolling	15.00 to 15.50
Heavy melting steel	15.00 to 15.50
Steel rails for melting	14.50 to 15.00
Car wheels	14.50 to 15.00
Per Net Ton	
No. 1 railroad wrought	13.00 to 13.50
Cast borings	10.50 to 11.00
Steel turnings	10.00 to 10.50
Railroad cast	15.50 to 16.00
No. 1 machinery cast	18.50 to 19.00
Burnt scrap	12.50 to 13.00
Iron axles	23.00
Locomotive tires (smooth inside)	14.50 to 15.00
Pipes and flues	9.50 to 10.00

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers	43⅛	44⅛	Int. Har. pf.	107	107
Allis-Chal. pf.	91⅝	92⅛	Jones & Laughlin	107⅝	107⅝
Am. B. S. & Fdy.	75⅛	75⅛	Lima Loco.	64	66⅝
American Can	102⅞	107⅝	Midvale Steel	28	28¾
Am. Can pf.	108½	109	Nat.-Acme	9	9
Am. Car & Fdy.	160	163	Nat. En. & Stm.	40⅜	42⅜
Am. Car & F. pf.	119	119	Nat. En. & S. pf.	89	89½
American Loco.	71⅛	71¼	N. Y. Air Brake	40	41½
Am. Loco. pf.	115⅛	116	Nova Scotia Stl.	15	15
Am. Radiator	91¾	96¼	Otis Steel	8½	9½
Am. Stl. Fdries.	36⅝	37⅝	Otis Steel pf.	55	57
Baldwin Loco.	122¼	127¼	Pressed Steel Car	52	54
Bald. Loco. pf.	111	111	Pressed Steel pf.	81	82
Bethlehem Steel.	51	53½	Replogle Steel.	10⅜	13½
Beth. Stl. 7% pf.	90¼	91⅛	Republic	46¼	50
Br. Em. Steel	4	4	Republic pf.	89	89⅞
Br. Em. Stl. 1 pf.	52¼	52¼	Sloss-Sheffield	55½	60⅛
Br. Em. Stl. 2 pf.	12⅜	13	Sloss-Sheffield pf.	84	84
Chic. Pneu. Tool	82	83	Steel of Canada	73½	76
Colo. Fuel	22½	23⅝	Transue-Wms.	33	34¼
Crucible Steel	64	66½	Un. Alloy Steel	30	31
Crucible Steel pf.	90⅝	90½	U. S. Pipe	61	66½
Deere pf.	61¼	62¼	U. S. Pipe pf.	81	82¾
Gen. Electric	192	197⅝	U. S. Steel	93⅞	96
Gt. No. Ore Cert.	27¼	29	U. S. Steel pf.	119¼	119¾
Gulf States Steel	78¼	82	Vanadium Steel	29	32⅝
Inland	34¼	36¼	W'house Air Br.	82⅞	86
Int. Har.	75¾	79½	Y'town S. & T.	67¾	68¾

Trade Changes

Under a new arrangement the A. D. Joslin Mfg. Co., 223 West Erie Street, Chicago, manufacturer of bank and railroad office equipment, will develop additions to its line. It is planned to enlarge greatly the scope of operation. As a step in the plan, L. D. Graham has been appointed vice-president in charge of sales and advertising.

Pilling & Co., Inc., announce the removal of the Philadelphia office to 1400 Bankers Trust Building, 1315 Walnut Street.

The Hayes Brass Foundry, Inc., is in new quarters at 1624 North Salina Street, Syracuse, N. Y., where facilities have been increased considerably.

The Standard Structural Steel Co., Hartford, Conn., formerly at 239 Homestead Avenue, has taken over the plant of the Hartford Iron Works, 1014 Weathersfield Avenue. With the increased facilities of its new location, the company will be in a position to handle structural steel work of any size.

The Oesterlein Machine Co., Cincinnati, has appointed John Cetrule of the Triplex Machine Tool Co. as district sales engineer for the New York territory, with headquarters at 50 Church Street, New York.

Automobile bumpers will be manufactured in the new factory building which has been added to the plant of the Penn Spring Works, Inc., Baldwinsville, N. Y., manufacturer of chassis springs. W. F. Martin, president of the Amco Mfg. Co., Indianapolis, has resigned from that organization as general manager and will become sales manager of the jobbers division of the Penn works.

BELGIAN MARKET STEADY

Prices Fairly Well Maintained—British Hematite Iron Sold in Belgium—French Steel Competes

ANTWERP, BELGIUM, Dec. 8.—The iron and steel market shows no change from the conditions of a fortnight ago. With the firmness of the exchange and a sufficient demand makers have been able to maintain prices on nearly all products. Moreover, the continued high exchange rates and higher wages have caused since the beginning of the year a continual increase of production costs. Consequently, sellers are not inclined to attract business by concessions in prices. For instance, coke, although produced largely of Belgian coals, has been steadily increasing. At the beginning of 1921 coke was sold at 117 fr. for ordinary and 150 fr. for washed. Prices declined until May, 1922, when they were 87 fr. for ordinary and 110 for washed. On Jan. 1 of this year prices rose to 108 fr. for ordinary and 155 fr. for washed. At their peak in the middle of the year, prices declined and were 172.75 fr. for ordinary and 217.50 for washed in November and December. During the great shortage of coke in the first half of the year iron and steel works were forced to buy quantities of British coke at high prices, while bonuses were as a rule paid for inland coke, the foregoing quotations representing only official and nominal prices. The same is true of wages, which are now, in some cases, 30 to 40 per cent higher than last year. Notwithstanding these conditions most works are well provided with orders. Especially during the past few weeks fair-sized orders have been received from abroad, principally Japan. Shipments have already been made on previous export purchases, and large quantities are awaiting shipment at Antwerp and at works. Deliveries are extended and in some cases makers are not offering better than three or four months.

Prices are unchanged, as follows, francs per metric ton, for domestic delivery:

	Frs.	
Commercial iron No. 2	700	$32.60
Commercial iron No. 3	725	33.80
Commercial iron No. 4	775	36.00
Heavy sheets	750	34.90
Thin sheets	1,150	53.50
Bar iron, base	700	32.60
Rails	700	32.60
Heavy beams	650	30.20
Open-hearth steel, ordinary	700	32.60
Spring steel	1,300	60.50
Galvanized wire, base	1,450	67.50
Wire nails	1,250	58.10
Basic Bessemer ingots	525	24.40
Blooms	550	25.60
Billets	580	27.00

For special specifications and early deliveries somewhat higher prices are obtained but not as a general rule. A number of British purchasers have been offering material but prices advanced have not always been as low as the quotations of Belgian makers.

Prices for high phosphorus foundry pig iron, after rising have again fallen to their former level. This is principally caused by the fact that Lorrain and Luxemburg works, for a time out of the market are again quoting. Semi-phosphorus foundry iron, analyzing Sil. 2.50 to 3.00 per cent, Mn. 1 per cent max., sul. 0.05 per cent, phos., 0.6 to 0.8, is quoted at 450 fr., f.o.b. Antwerp or $25.50 c.i.f. New York and $26 c.i.f. Pacific ports. Basic pig iron is not available yet. Nominal prices are about 425 fr. or $19.75. Good inquiries are on the market from England but the entire production is being consumed by the steel works for their own requirements. Belgian hematite iron is not offered in large quantities. Deliveries offered by the makers are extended and prices high. Quotations are about 530 fr., fo.b. Antwerp, $24.65 or 113s. Most of this business is going to British makers, who are quoting 107 to 108s., c.i.f. Antwerp.

For semi-finished products there is strong competition from Lorrain works. In general they quoted lower prices than Belgian makers either for domestic consumption or for deliveries f.o.b. Antwerp. Bars have gone on a basis of 675 fr. f.o.b. Antwerp, $31.40, while prices for beams have declined to 630 fr., $29.30, which is about $1 under the quoted prices. French quotations were principally the cause of these reductions as Belgian works as a result of the orders in hand would certainly have maintained the last quoted prices, especially as there has been a good British demand for steel and prices offered in pounds sterling were quite acceptable.

BRITISH IRON AND STEEL

Production and Export Movement for Eleven Months Compared

WASHINGTON, Dec. 24.—Iron and steel exports from the United Kingdom in November amounted to 394,891 gross tons, or an increase of about 2 per cent over October, according to a cable received by the Department of Commerce from Commercial Attaché Walter S. Tower, London. Imports of iron and steel products into the United Kingdom totaled 97,462 tons in November, which was next to the smallest figure of the year, imports in May amounting to only 82,248 tons. Exports from the United Kingdom for the 11 months ended with November amounted to 3,964,666 tons, and the total for the year 1923 will be between 4,350,000 and 4,400,000 tons. Imports for the 11 months were 1,214,261 tons and the total for the year is estimated at approximately 1,300,000 tons.

In the first table are imports and exports, by-products, for October and November of this year.

British Iron and Steel Trade During October and November, 1923, in Gross Tons

	Imports		Exports	
	October	November	October	November
Pig iron and ferroalloys	4,231	6,693	66,490	57,798
Ingots, blooms, billets, slabs, etc	46,984	40,115	1,668	1,644
Tin plate	....	....	51,398	55,552
Galvanized sheets	....	....	57,835	61,742
Plates and sheets	7,807	6,191	50,475	59,370
Steel bars, rods, angles, etc.	9,704	10,949	37,805	34,261
Iron bars, rods, angles	12,144	12,061	3,997	4,534
Rails	1,008	856	22,962	28,985
Railroad material, other than rails	881	1,364	15,346	17,879
Structural steel	7,152	4,429	7,799	8,769
Hoops and strips	1,776	2,370	7,894	6,160
Cast tubes, pipes and fittings	1,364	1,010	7,160	7,089
Wrought tubes, pipes and fittings	2,337	1,412	14,803	12,967
Bolts and nuts, including screws for metals	306	575	2,201	2,555
Nails, tacks, rivets and washers	438	457	1,458	1,600
Wire	2,955	2,424	6,449	6,202
Wire cables and rope	....	....	2,601	1,933
Wire nails, including staples	4,189	3,573	380	349
Wire manufactures, n.e.s.	392	284	2,923	1,715
Castings	506	638	835	167
Forgings	180	169	138	155

Pig iron production for November reached 597,600 tons and steel ingots 749,500 tons, compared with 592,600 and 702,100 tons respectively for the previous month. There were 199 blast furnaces and 345 open-hearth furnaces in operation at the end of November compared with 188 blast and 306 open-hearth furnaces at the end of October. The cable adds:

"The total output of pig iron for the 11-month period is 6,807,900 tons and that of steel ingots 7,889,400 tons. If approximately the same production or a little better is maintained during December, the figure for pig iron will be within 25 per cent of the pre-war year of 1913 and about equal to that of 1921 and 1922 combined. Steel ingots will be one-eighth greater than 1913 and about 10 per cent short of the total output of 1921 and 1922 together. Taken as a whole, with allowances for the lack of domestic demand and the general unsettled conditions in continental Europe and other parts of the world, iron and steel production in the United Kingdom and its foreign trade in 1923 compare favorably with previous years. In a broad way

the British iron and steel industry faced comparable, if not similar, conditions to those which were met by the American industry in 1922."

Except for a falling off during the summer months in the third quarter, there has been a steady improvement during the year insofar as quantities are concerned. In the second table monthly averages of production, imports and exports for the post-war years are compared with those of 1913. It will be noted that in 1923 the tonnage of exports is 50 per cent as great as the tonnage of ingots, compared with 66 per cent in 1913.

British Iron and Steel Production and Foreign Trade, 1913 and 1919 to 1923 Inclusive, in Monthly Averages, in Gross Tons

	Production		Iron and Steel Products	
Year	Pig Iron	Steel Ingots	Imports	Exports
1913.....	855,000	639,000	185,900	414,100
1919.....	617,000	658,000	42,400	186,000
1920.....	669,500	755,600	92,400	271,000
1921.....	217,600	302,100	137,100	141,400
1922.....	408,300	486,000	73,500	283,100
1923*.....	618,900	717,200	110,400	360,400

*Average for 11 months.

To Test Flexibility Provision of Tariff

Mandamus Suit Will Bring Decision on an Important Feature of the Fordney Act

WASHINGTON, Dec. 24.—Affording the first opportunity for a court decision regarding the constitutionality of the flexible provision of the tariff, unusual interest has been manifested in the mandamus suit recently filed in the Supreme Court of the District of Columbia by Attorney Marion De Vries on behalf of the Norwegian Nitrogen Products Co., Inc., importer of sodium nitrite. Judge De Vries formerly was presiding Justice of the United States Court of Customs Appeals and took a prominent part in framing the administrative and flexible sections of the present tariff act, and the action he has instituted is to clear up the much discussed question as to whether Section 315, the flexible provision of the tariff act, is constitutional. In his petition for a writ of mandamus, Judge De Vries affirms the legality of the flexible provision and at some length gives his reason for the belief that Congress was acting within its power in delegating to the President the right to raise or lower imposts. Specifically, the suit relates to the right of the Norwegian Nitrogen Products Co., Inc., to inspect all the data presented by a domestic corporation, the American Nitrogen Products Co., which filed an application for an increase in the tariff duty on sodium nitrite.

In the petition filed with the Court, Judge De Vries maintains that large sums of money are being expended by the Tariff Commission and that the business of the country is being held in abeyance by various proceedings and that members of Congress are relying upon the commission and the President to specify demands for changes in duties which are deemed for the public welfare. All of this, it is pointed out, will be of no avail if the flexible provision is declared unconstitutional. For this reason the petition suggests early action by the court on the petition.

In addition to presenting the question of constitutionality, Judge De Vries says the petition also involves the question of the right of interested parties to inspect all data presented by a petitioner or collected by the commission, and the right of interested parties to be heard on this issue as well as the right to offer contravening evidence. Judge De Vries says the issue is not what should be done in such a case as a political or economical question, but what are the rights of the parties under the law as presently written.

This feature of the law, it is declared, received considerable attention by Congress, but not so much as the active principle of the law and its constitutionality, or what trade facts should be made by Congress, the duties to be ascertained and proclaimed by the President.

Judge De Vries says that if the two issues involved can not be presented and decided in the proceeding of the kind such as he brought, the only way in which they can be determined would be to wait until after proclamation by the President of the rate of duty under the flexible provisions, and until an importation of merchandise affected by a change in rates was made, a new duty levied, a protest made to the Board of General Appraisers, hearings held, decision made by the board, its appeal to the United States Court of Customs Appeals, and finally, a review by the Supreme Court of the United States. Judge De Vries declared that this routine would probably require two years.

Production of Pig Iron and Steel in Canada Decreases

The production of pig iron in Canada for November reached a total of 62,202 long tons, or 11,396 tons less than that produced in October, when the output amounted to 73,598 tons. The quantity of basic and foundry iron was fairly well maintained, 38,110 tons of basic iron being made for the further use of the companies reporting, while practically the entire output of 15,416 tons of foundry iron was made for sale. Malleable iron made for sale amounted to 8676 tons, a decline of 43 per cent from the output in October.

The cumulative production for the 11 months ending with November by grades was 513,774 tons of basic pig iron; 209,188 tons of foundry iron; and 97,434 tons of malleable iron, or a total output of 820,396 long tons. Compared with the production for the 11 months of other years, the production of 1923 shows an increase of 114 per cent over that of 1922 and 48 per cent over that of 1921. The average monthly production to date this year was 75,000 tons, and during the past five years this average was exceeded only once, this being in 1920, when the monthly average reached 84,000 tons.

The lowered output of pig iron was reflected in a decreased production of steel ingots and castings, the output for the month being 54,674 gross tons as compared with 67,496 tons in October. The decline was chiefly in steel ingots produced for the further use of the companies reporting and in the quantity of steel casting made for sale. Steel ingots amounted to 51,426 tons or a decline of 18 per cent from the output in October, and the output of steel castings dropped to 3248 tons or 30 per cent below the October figures. The production of ingots and castings for the 11 months of this year was 843,522; this being some 48 per cent greater than for the corresponding period of 1922, and 26 per cent above the total tonnage of 1921. The average monthly production this year reached a total of 77,000 tons, as compared with a monthly average for the past five years, 1919 to 1923, of about 69,000 tons.

The Algoma Steel Corporation, Sault Ste. Marie, Ont., will start operations at its rail mill on Jan. 14, and it is also expected that the merchant mill will start at the same time. With the starting of these mills the corporation proposes to blow in two blast furnaces in addition to the one now blowing, and additional coke ovens will be operated as well as both open-hearth plants. No announcement has been made as to what rails will be rolled, as negotiations are still pending with the railway companies, but it is expected that the first rolling will be for the Canadian National Railways for the Eastern lines.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinfor ing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c.
Bands, base, per lb.....3c.
Strips, base, per lb.....3c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Galvanized wire, No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100 lb..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg..... 2.70
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads. 60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in., 50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.50c. off list
Hot pressed nuts, tapped.....4.50c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller, 50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller, 65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.		Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80	⅞-in.	$15.00	$15.00
5/16-in.	5.50	6.00	1-in.	19.50	20.00
⅜-in.	6.50	7.00	1¼-in.	28.50	28.50
7/16-in.	9.00	9.50	1⅛-in.	37.00	37.50
½-in.	11.00	11.50	1-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws.....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.90
Small rivets .....65, 10 and 5 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$3.00 to $3.15
Spikes, ½ in., 9/16 in. and ⅝ in., per 100 lb..... 3.15 to 3.25
Spikes, 7/16 in..... 3.15 to 3.25
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.50
Track bolts, ¾ in and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜.....	+11	+39
¼ to ⅜.....	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½.....	30	13
1 to 3.....	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6.....	59	47½	2½	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	41½	7 to 12.....	26	11
11 and 12....	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3.....	61	50½
¼ to ⅜.....	47	30½	¼ to ⅜.....+19		+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½.....	60	49½	1 to 1½.....	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12....	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1½ in. .....+18	
2½ to 2¾ in.....	37	1¾ to 1⅞ in.....+ 8	
3 in.	40	2 to 2¼ in.....— 2	
3¼ to 3¾ in.....	42½	2½ to 3 in.....— 7	
4 to 13 in.....	46	3¼ to 4½ in.....— 9	

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1¾ in.	31	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		
Hot Rolled			
3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in....	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....84 per cent off list
Carbon 0.30 to 0.40, base.....82 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage.....	35
2-in. O.D. 10 gage....	17	1½-in. O.D. 9 gage...	15
2¼ in. O.D. 12 gage..	17	5/8-in. O.D. 9 gage...	55
2¼-in. O.D. 11 gage..	18	5½-in. O.D. 9 gage...	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C....	$14.90
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....4.90c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganse ore, washed, 51 per cent manganese, from the Caucasus, nominal	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$109.00 to $110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Ferrosilicon, 50 per cent, delivered	75.00
Ferrotungsten, per lb. contained metal	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	11c. to 12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	10c. to 11c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent....$38.00 to $39.00
Spiegeleisen, domestic, 16 to 19 per cent.... 37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50.
Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

	High Duty	Moderate Duty
Fire Clay:		
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		48.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c. to 2.40c.
Skelp, sheared, per lb.	2.35c. to 2.40c.
Skelp, universal, per lb.	2.35c. to 2.40c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅞-in. and larger, base, per 100 lb.	$3.00 to $3.15
Spikes, ½-in. and smaller, base, per 100 lb.	3.15 to 3.25
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Cold finished steel bars, base, Chicago per lb.	3c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200* (Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43	*Pacific Coast	$1.15
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735	*Pac. Coast, ship plates	1.20
Baltimore, domestic	0.31	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705	Birmingham	0.58
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60	Memphis	0.56
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735	Jacksonville, all rail	0.70
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705	Jacksonville, rail and water	0.415
Boston, domestic	0.365	Chicago	0.34	Denver	1.26	New Orleans	0.67
Boston, export	0.255			†Denver (pipe)	1.17		

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Awards Total Nearly 26,000 Tons, With More Than 36,000 Tons Pending

Pre-holiday week brought no marked change in the unusual winter activity of structural steel work. Projects awarded during the week, as reported to THE IRON AGE, totaled nearly 26,000 tons, including 5000 tons, the largest single job, for a bridge at Sunbury, Pa., for use of the Pennsylvania Railroad. Bridge work totaled 8650 tons. Of the new work that has come out for bids, 11,000 tons of a total of more than 36,000 tons, is for a tower for the Chicago *Tribune* Building, Chicago, and there are two other new projects each of 5000 tons.

Pennsylvania Railroad, bridge at Sunbury, Pa., 5000 tons, to Bethlehem Steel Co.

Philadelphia Coppersmithing Co., Philadelphia, manufacturing building, 125 tons, to Montgomery Iron & Steel Co.

American Cellulose Co., Cumberland, Md., 900 tons to Lehigh Structural Steel Co. and 600 tons to Austin Co.

Norfolk & Western Railroad, bridge, 200 tons, to American Bridge Co.

Baltimore & Ohio Railroad, bridge, 2000 tons, mentioned last week as being awarded to unnamed fabricator, went to Fort Pitt Bridge Works.

State Hospital, Middletown, N.Y., 250 tons, to Kellogg Structural Steel Co.

New York Central Railroad, bridge repairs, 2500 tons, of which 2250 has been awarded to the McClintic-Marshall Co. and 250 to Bethlehem Steel Co.

Barnard College, dormitory, 650 tons, to Harris Structural Steel Co.

Turner Construction Co., apartment building, New York, 500 tons, to Hedden Iron Construction Co.

New York Telephone Co., Seventy-third Street, New York, 600 tons, to Eidlitz & Ross.

Public schools Nos. 71 and 121, totaling 2000 tons, to A. E. Norton, Inc.

Japan, standardized steel buildings, 1,000,000 sq. ft., to Milliken Brothers Mfg. Co.

Sadowsky loft building, West Thirty-eighth Street, New York, 2500 tons, to Hinkle Iron Co.

Public school No. 202, Brooklyn, 1500 tons, to Levering & Garrigues Co.

Donaldson store building, St. Paul, Minn., 3500 tons, to Minneapolis Steel & Machinery Co.

Board of Trade Building, Kansas City, Mo., 1200 tons, to Kansas City Structural Steel Co.

Great Northern Railroad, repairs to bridges Nos. 95 and 68, 950 tons to American Bridge Co.

Milwaukee Electric Railway & Light Co., 600-cu yd. dump scow, 210 tons, to Milwaukee Bridge Co.

Board of Commissioners, Port of New Orleans, dock shed at Claiborne Avenue, 1750 tons, to Lukens Steel Co.

Ford Motor Co., low temperature coke oven bunkers, 765 tons, and by-product building, 165 tons, River Rouge, Mich., to Whitehead & Kales.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

New York Telephone Co., building on West Street, New York, 18,000 tons, previously mentioned, will probably be awarded within a week, action being held up pending the outcome of an appeal to the Bureau of Standards and Appeals for modification of zoning law restrictions.

New York Telephone Co., central exchange, Yonkers, N. Y., 600 tons.

Shroeder & Koppel loft building, mid-town section, New York, 1500 tons.

New York Central Railroad, bridge repairs, 200 tons.

New York, New Haven & Hartford Railroad, bridge repairs, 200 tons.

Hotel, West Palm Beach, Fla., 1500 tons.

Bellevue Hospital, two pavilions, 2000 tons; job previously reported as 1000 tons.

Chicago Tribume tower, Chicago, 11,000 tons, bids to be in by Jan. 15.

Ford Motor Co., assembly plant, St. Paul, Minn., 6000 tons, plans being revised.

Lake Shore Athletic Club, Chicago, 5000 tons.

St. Lukes Hospital, Chicago, 5000 tons.

Crane Co., Chicago, boiler house addition, 700 tons.

High school, Ironwood, Mich., 700 tons, bids in.

Highway bridge over Eel River, State of Indiana, 220 tons, bids in.

Louisville & Nashville Railroad, warehouse, at New Orleans, 1300 tons, bids being taken.

Louisville & Nashville Railroad, machine shop, at Etowah, Ala., approximately 450 tons, bids being taken.

Elks' Club, Wichita, Kan., 300 tons.

Ford Motor Co., assembly plants at Louisville, Ky, 2000 tons; Charlotte, N. C., 1650 tons; Memphis, Tenn., 1650 tons; Jacksonville, Fla., 750 tons.

Nurses' Home, Ann Arbor, Mich., 200 tons.

RAILROAD EQUIPMENT BUYING

Orders and Fresh Inquiries Each Number 1225, But Not Heavy in Steel

Orders for railroad cars were placed for 1225 and fresh inquiries appeared for a like number, but the steel requirements are not heavy in the case of this equipment.

The car service division of the American Railway Association announces that reports filed by the carriers showed that on Dec. 1, 155,626 freight cars, or 6.8 per cent of the ownership, were in need of repairs. This was an increase of 6434 over the number in need of repairs on Nov. 15, at which time there were 149,192, or 6.5 per cent.

The Cotton Belt has awarded orders for 1000 box cars, half each to the American Car & Foundry Co. and the Mount Vernon Car Mfg. Co.

The Western Pacific has ordered 200 box cars from the Standard Tank Car Co.

The Western Fruit Express is inquiring for 1000 refrigerator cars.

The Lehigh Valley has placed 25 milk cars with the American Car & Foundry Co.

The Western Pacific has increased its inquiry for 500 refrigerator cars to 775.

The Seaboard Air Line is in the market for 932 flat car bodies.

Swift & Co., Chicago, are inquiring for 100 to 300 underframes.

The Great Northern has placed 500 underframes with the Minneapolis Steel & Machinery Co.

The Carmichael Safety Gate Co., Indianapolis, organized to manufacture a safety gate designed to prevent accident and loss of life at railroad grade crossings, has been incorporated for $50,000. The device, patents for which are held by H. E. Carmichael, is to be built at the plant of the Castle Refrigerator & Machine Co., 138 South Neal Street, Indianapolis. Mr. Carmichael is president of the company, Oden Wadleigh, vice-president, and Charles Lutz, secretary-treasurer.

The Chicago, Milwaukee & St. Paul Railroad has been authorized by the Interstate Commerce Commission to extend its line to the new Ford Motor plant, under construction in St. Paul. It will require five miles of track to reach the Ford plant from the present line of the C. M. & St. P. Railroad.

Plans are in progress for railroad shops and yards at Evansville, Ind., by the Illinois Central Railroad that will cost approximately $1,000,000. The program will include round house shops, tracks, coal bunkers and several buildings. F. L. Thompson, 135 East 11th Place, Chicago, is the company's engineer.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Dec.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
19.....	13.25	12.87½	46.62½	8.00	7.75	6.55	6.20
20.....	13.25	12.87½	46.57½	8.00	7.75	6.57½	6.22½
21.....	13.25	12.87½	47.12½	8.00	7.75	6.60	6.25
22.....	13.25	12.87½	....	8.00	7.75	6.60	6.25
24.....	13.25	12.87½	47.30	8.00	7.75	6.60	6.25

*Refinery quotations; delivered price ¼c. higher.

New York

NEW YORK, Dec. 24.

Holiday dullness pervades all the markets and they are featureless. The copper market is steady and the tin market is firm. Lead is scarce and higher and the zinc market is a little stronger.

Copper.—The copper market continues practically unchanged in the firmness which has characterized it for several weeks, although demand has fallen off a little in the last few days. A fair amount of inquiry continues, with some buying. While the minimum quotation is 13.12½c., delivered, with some asking 13.25c. for first quarter delivery, there were one or two isolated cases last week of 13c., metal, but they were not sufficient to establish a market. Lake copper is quoted at 13.25c., delivered, but largely nominal.

Tin.—The week has been another moderately active one with sales running into several hundred tons. On Dec. 18 and 19 there were some dealers who attempted to press the metal on the market and as a consequence prices gave way, but on Thursday, Dec. 20, these dealers became buyers and later in the day consumers came into the market so that the total turnover was at least 500 tons. Purchases were made on a scale up from 46c. to 46.62½c., with some transactions as high as 46.75c. early in the evening. Today at least 100 tons has changed hands with the market firm and higher. During the week about 200 tons was sold on the New York Metal Exchange. Spot Straits tin today was quoted at 47.30c., New York, but there are no London prices today because the market there is closed from last Friday night to next Thursday morning. Arrivals thus far this month have been 4470 tons, with 4241 tons reported afloat.

Lead.—The market is very strong and business has been done up to 8c., New York, and over. There was a sale of one round lot in the last few days for delivery late in January at 8c. and there are sellers asking 8.12½c. and higher. A sale is also noted of a substantial quantity, but less than a carload, at 8.25c., New York. The American Smelting & Refining Co. advanced its price Dec. 19 to 7.40c., New York, an increase of $3 per ton. The metal is exceedingly scarce.

Zinc.—Due to a little more activity on the part of consumers and dealers, prime Western advanced about five points during the week and is now quoted at a minimum of 6.25c., St. Louis, or 6.60c., New York. Just at present there is very little activity, but the market is considered strong.

Old Metals.—The market is sluggish and business is very quiet. Dealers' selling prices are as follows:

	Cents per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire	11.75
Copper, light and bottoms	10.00
Heavy machine composition	10.75
Brass, heavy	8.00
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.00
Lead, heavy	7.00
Lead, tea	5.75
Zinc	5.00
Cast aluminum	18.00
Sheet aluminum	18.00

Nickel.—Quotations of shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. Both shot and ingot nickel in the outside market are quoted at 29c. to 32c. per lb.

Antimony.—Chinese metal is scarce and higher and sales for spot delivery have been made at 10.25c., New York, duty paid, with transactions for shipment from China at any time in the next few months at 9.50c., duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26c. to 26.50c., duty paid, with only a few importers able to do business. The leading American producer does not make public its quotations.

Chicago

CHICAGO, Dec. 24.—Tin and lead have advanced while zinc has declined. Although the week was quiet, activity is on an ascending scale. This has been particularly evident in the case of tin which is now being purchased more freely by consuming interests whereas heretofore buying has been confined largely to dealers. There has also been increasing interest in lead and copper among the old metals, grades of lead and tin having advanced. We quote in carload lots: Lake copper, 13.50c.; tin, 48.50c.; lead, 7.70c.; spelter, 6.25c.; antimony, 11c., in less than carload lots. On old metals we quote copper wire crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 6.50c.; zinc, 4.25c.; pewter, No. 1, 27c.; tin foil, 33c.; block tin, 38c.; all buying prices for less than carload lots.

GERMAN IRON ABOVE PRE-WAR

Foundry Pig Higher in Germany Than in England or United States

(By Radiogram)

BERLIN, GERMANY, Dec. 24.—Foundry pig iron is now quoted at 116 gold marks per metric ton ($28.05 per gross ton).

[This compares with 75.50 m. ($18.27) pre-war; with 5549 m. (paper, amounting to $18.60) Apr. 1, 1922; 153,688 m. ($23.42) Dec. 26, 1922; 616,300 m. ($29.74) Apr. 9, 1923 and with 12,960,000 m. ($12.51) July 30, 1923. It compares also with $23.32 for British (Cleveland) No. 1 foundry iron (last week) and with $21.88 prevailing for several weeks as THE IRON AGE pig iron composite price, of which $22.75 represents the level of foundry iron.]

Detroit Scrap Market

DETROIT, Dec. 24.—Practically no sales of old material were made during past week. Dealers are expecting heavy shipments during the early part of January as all stocks of metal on melters' yards are at a very low point. One of the largest producers is offering approximately 3500 tons of short shoveling turnings, cast iron borings, steel flashings, regular hydraulic compressed and heavy melting steel on a competitive basis for January delivery. Prices are the same as a week ago.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to $15.00
Shoveling steel	13.50 to 14.50
Borings	10.00 to 11.00
Short turnings	10.00 to 11.00
Long turnings	9.50 to 10.00
No. 1 machinery cast	17.00 to 18.00
Automobile cast	23.50 to 24.00
Hydraulic compressed	11.50 to 12.00
Stove plate	15.00 to 16.00
No. 1 busheling	10.00 to 11.00
Sheet clippings	8.75 to 9.25
Flashings	10.50 to 11.00

Extensions to the plant of the Timken Roller Bearing Co., Canton, Ohio, recently reported, will include the installation of a 32-in. blooming mill and soaking pits. New buildings will be erected for this department.

PERSONAL

Louis I. Brown, president, Brown-Ward Co., Detroit, has been elected president of the Star Furnace Co., Jackson, Ohio, succeeding the late C. O. Brown. Homer E. Davis is secretary.

P. F. Frost, has been appointed general manager of sales with offices at 149 Broadway, New York, by the Cambridge Wire Cloth Co., Cambridge, Md.

Col. Oscar H. Fogg, secretary-manager of the American Gas Association, 342 Madison Avenue, New York, has resigned to become president and general manager of the Baltimore Gas Appliance & Mfg. Co., Baltimore. Colonel Fogg has headed the association since 1919. He will be succeeded by Alexander Forward of Richmond, Va., a member of the Virginia State Corporation Commission, which position he has resigned.

James Partington of the American Locomotive Co., New York, has been made chairman of the standing committee on professional divisions of the American Society of Mechanical Engineers for 1924. Other members of the committee are H. V. Coes, John H. Lawrence, Sanford A. Moss, and F. O. Hoagland.

James A. Smith, general superintendent, General Electric Co., Schenectady, N. Y., has been chosen head of the machine shop practice division of the American Society of Mechanical Engineers for the coming year. The division will cooperate in preparing the technical program for the annual machine tool exhibit at New Haven in the early autum.

S. M. Fechheimer, who has been connected with the Truscon Steel Co. since its inception 20 years ago, for the first five years actively in charge of engineering work and for 15 years in charge of publicity and advertising, has established himself in the advertising business as the Industrial Advertising Co., 615 Wayne Street, Detroit.

Samuel T. Harleman has resigned as assistant to vice-president and general sales manager of the Atlas Steel Corporation, Dunkirk, N. Y., and will be connected with Henry Disston & Sons, Inc., Tacony, Philadelphia, as assistant manager of the steel sales department. Mr. Harleman graduated from Lehigh University in 1901 in mechanical engineering and after five years in the motive power department of the Lehigh Valley Railroad, entered the steel business with the Bethlehem Steel Co. at the Bethlehem plant, leaving in 1918 to go with the Atlas company.

Frank L. Gilman, works manager of the new Kearny, N. J., branch, Western Electric Co., New York, now under construction, has announced the following appointments at this plant: H. G. Dean, plant manager, heretofore inspector of plants with headquarters at New York; F. A. Macnutt, clerical and production superintendent, formerly supervisor of personnel and installation at the Hawthorne, Ill., works; G. A. Landry, assistant technical superintendent, manufacturing division, previously engineer in the installation department at the Hawthorne plant; Frederick Kuster, assistant clerical superintendent manufacturing division, previously superintendent of equipment service at Hawthorne, and E. G. Johnston, assistant superintendent of industrial relations, previously in that capacity at the Hawthorne plant.

Richard H. Scott, formerly vice-president and general manager, Reo Motor Car Co., Lansing, Mich., has been elected president, succeeding R. E. Olds, who becomes chairman of the board of directors. Horace Thomas, chief engineer, has been elected vice-president to succeed Mr. Scott.

Fred R. Low, president, American Society of Mechanical Engineers, has accepted the invitation of the Engineers Society of Milwaukee to be guest of honor and address the monthly meeting to be held on Jan. 16, at the Milwaukee Athletic Club.

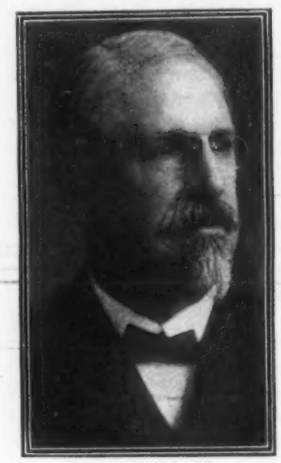
Joseph Grossman, president, Grossman Brothers Co., iron and metals, 240 Madison Street, Milwaukee, has resigned and is retiring from all connection with the company. He will engage in business on his own account and expects to announce his new location Jan. 1.

J. E. McLurg, general manager, Halifax Shipyards, Ltd., has been appointed vice-president of the British Empire Steel Corporation, Montreal, Quebec, filling the vacancy created by the retirement some time ago of D. H. McDougall. The new vice-president will be in charge of operations of all constituent companies, with headquarters at Halifax, N. S. Prior to the war, Mr. McLurg was associated with the Algoma Steel Corporation, as superintendent of transportation and manager of sales. He went overseas and on his return to Canada took up his duties as general manager of the Halifax Shipyards, Ltd.

Obituary

Charles Harvey Pond

CHARLES HARVEY POND, brief mention of whose death was made in THE IRON AGE last week, was born in Southington, Conn., Dec. 15, 1847, a descendant of an old New England family, whose members were counted among the earliest settlers of Connecticut. He was educated in the public schools and Lewis Academy, in his native town. His early manhood was spent in learning the iron manufacturing business and in 1874 he was junior member of the firm of Taylor, Mitchell & Pond, Massilon, Ohio, manufacturers of T-rails. After five years there Mr. Pond returned to Southington, where he was connected with J. B. Savage, manufacturer of forgings, and in 1887 that business was moved to Scranton, Pa., and incorporated as the Scranton Forging Co.



C. H. POND

At first Mr. Pond was secretary and manager, but in 1890 he succeeded to the presidency. At the time of his death on Dec. 3 he was president and manager. He was interested in several other Scranton enterprises and was one of the organizers of the Pennsylvania Manufacturers' Association.

In an extended tribute to his business ability and to his characteristic kindly manner the *Scranton Chamber of Commerce Journal* said: "He was, all of his life in this city, one of the active members of the Scranton Board of Trade. Not willing to be a merely contributing member of the organization, he always took an active part in its work and at the time of his death was one of a small committee of five which was making a detailed investigation of one of the most important industrial propositions that has been before the organization in years."

WILLIAM J. HAYNES, president Haynes-Langenberg Mfg. Co., St. Louis, manufacturer of furnaces, died at his home there on Dec. 20, after an illness of two weeks. Mr. Haynes was born in Mount Airy, N. C., in 1851, a direct descendant of Maj. Robert Hill, who fought in the Revolutionary War. He went to St. Louis in 1861, in a prairie schooner. He had been connected with the Haynes-Langenberg Co. for the last ten years, previously having been with the Langenberg Grain Co.

H. C. WHITTLESEY, formerly secretary-treasurer Wilcox, Crittenden & Co., Inc., Middletown, Conn., manufacturer of marine hardware, died on Dec. 18, while visiting his son, P. V. Whittlesey, at Nyack, N. Y. He was born in Newington, Conn., in 1857 and was graduated from Yale University with high honors in the class of 1880. Last year Mr. Whittlesey resigned from active business life, having served many years as secretary-treasurer of the company.

High-Speed Steel for Cast Tools

(*Continued from page* 1712)

possible volatilizing caused by the intensive heat of the arc. If the addition of this alloy is necessary after the preliminary analysis, care must be taken to repeatedly stir the bath, as tungsten is comparatively heavy and easily settles on the furnace bottom, making uniformity of the melt impossible. It is preferable to avoid large additions of this alloy at late periods of the operation.

Chrometungsten alloy is recommended for all additions where it is possible to be used, as it goes into solution much more readily than the mixed alloys of chrome and tungsten. It is also true of all these alloys that those containing small amounts of carbon do not go into solution as readily as those having a higher carbon content.

Let us assume a ton of steel is to be made in the electric furnace to meet the following specifications in percentages:

Car.	Mang.	Sil.	Phos.	Sul.	Van.	Chr.	Tgn.
0.65	0.45	under	under	under	1.40	3.75	17.50
0.75	0.55	0.25	0.020	0.020	1.60	4.25	18.50

The method of proportioning the charge is given in Table 1, and it will be noted that the calculated preliminary analysis follows the procedure given above, and is: Carbon, 0.55; manganese, 0.30; silicon, 0.17; vanadium, 0.75; chromium, 4.27, and tungsten, 18.50. The figures for carbon, chromium and tungsten are increased or decreased according to the working of the furnace. It will be appreciated that these are not exact figures of the process.

Charging the Material

The heaviest pieces of scrap are placed on the bottom of the furnace, directly under the electrodes, then wash metal (when used), then the rest of the high-speed scrap, followed by Swedish iron, ferrochrome and ferrotungsten. The amount of high-speed scrap added was 30 to 50 per cent of the charge, although some heats were made using 90 per cent high-speed scrap. However, this was done only in cases where very desirable scrap was available. The whole charge is placed in the furnace at one time, as quickly and in as compact a mass as possible, then covered with a blanket of lime to reduce oxidation of the scrap during melting. With the doors sealed, the power is turned on and in a short time, when steady arcing is obtained, the maximum amount of current is "shot in" on the high voltage tap, the object being to melt down as quickly as possible. During this melting period the furnace doors are not opened except when absolutely necessary to push in the remainder of the scrap clinging to the banks or because of some trouble developing, such as electrode breakage, etc. In this manner a mildly oxidizing atmosphere should be obtained in the melting chamber shortly after starting the furnace and later change to a neutral atmosphere as the melting progresses, which closely resembles crucible practice.

Shortly before the scrap is all melted fluorspar is added to thin up the heavy slag and, as previously mentioned, this slag is usually white or slightly reducing. The bath must now be well rabbled to insure a uniform composition of the metal. If the slag for some unforeseen reason contains a quantity of oxides indicated by its dark color, a slag mixture of lime, 50 per cent silicon and coke is shoveled on the slag, which is similar to usual electric furnace practice. These additions must be continued at reasonable periods until the greater proportion of the oxides has been reduced into the metal and a white or slightly carbide slag is obtained. A spoonful of metal is then taken out of the furnace from which a wafer test for the chemist is poured and also a block test for the melter's observation. The surface of this block test almost always indicates the condition of the metal in the furnace and some high-speed steel makers claim that further information cannot be secured by fracturing the test piece. However, on this point the writer does not agree, especially when making steels which have to be in excellent condition before pouring. We always break the block tests, being sometimes surprised at the texture of the fracture or other conditions observed, and this when the outer surface of the test indicated the steel apparently to be normal.

In 30 to 45 min. after the first preliminary test was taken the carbon should be known and any adjustment of this element made. As many more preliminary tests should be taken for carbon as will insure correct final analysis, allowance being made for the usual carbon pick up from the carbide slag which varies from 0.05 to 0.10 per cent, depending on several conditions. Should the preliminary carbon be too high or chromium or tungsten much too low, the heating up of the metal is arrested and the necessary iron and alloys added as quickly as possible. Such an occurrence delays the operation an hour or more and often means reworking the heat with the attending possibility of having adverse furnace conditions and an inferior product. It takes a large percentage of tungsten about an hour to melt and be thoroughly mixed in the bath by repeated stirrings while chromium will be taken up by the metal much quicker. However, the chromium oxidizes more readily, forming calcium chromate, and it is often necessary to reduce this from the slag before proceeding too far with the heat.

While waiting an hour to an hour and a quarter for the rest of the preliminary analysis, the bath is gently stirred a few times to aid in the elimination of impurities and equalize the temperature. After each stirring slag and metal tests are taken for observation and when necessary, additions of lime, spar and coke are made to maintain a reducing condition. All through the operation the furnace doors are opened only when absolutely essential, the idea being to exclude atmospheric oxygen as much as possible. During this interval the temperature of the bath is gradually raised by increasing the amperage on the low voltage tap with the object of securing the maximum desired temperature, with a nearly completely degasified metal, shortly after the preliminary analysis is reported. This high temperature also results in the possibility of slag diminution in the steel and also the hotter the metal[1] the more completely may it be degasified.

The preliminary analysis reported should now be about as follows, showing a pick up of carbon and slight reduction of other elements as compared with the calculated amounts; such slight oxidation of the alloys indicates good furnace conditions and the metal therefore should be in excellent shape:

	Car.	Man.	Sil.	Van.	Chrome	Tungsten
Preliminary Test	0.58	0.20	low	0.50	4.10	18.20
Percent bath to be raised.....	0.07	0.30	0.05	1.00	none	none

The manganese and vanadium are calculated slightly higher than desired to allow for losses in further deoxidizing the metal. The usual formula used in figuring these additions is given, and also its application.[2]

(Pounds of Alloy to be added) = (Weight of Metal) x (Per cent Metal to be Raised) = (Per cent Ferroalloy) — (Percentage Desired in Final Metal)

As the bath already contains 0.50 per cent vanadium and 1.00 per cent additional is desired, then (2000 × 1.10 per cent) divided by (35 per cent alloy minus 1.50 per cent desired in final metal) equals 66 lb. ferrovanadium. Reduced to actual figures is: 2000 × 1.10 ÷ (35 — 1.50) = 66 lb. Va. As this ferrovanadium contains 1.42 per cent carbon, then 66 × 1.42 ÷ 2000 = 0.04 per cent carbon bath will be increased by this ferrovanadium addition.

The manganese and silicon are figured in a similar manner, except in this case the percentages desired in the final metal are so small that this is not considered in the formula. Manganese calculation is $\frac{2000 \times 0.35}{80}$ =9 lb. ferromanganese. As this 80 per cent ferromanganese contains 6 per cent carbon, then 9 × 6 ÷ 2000 = 0.03 per cent carbon, bath will be raised by this

[1] Acid Electric Furnace Operation, J. M. Quinn, THE IRON AGE, April 26, 1923.

[2] Short Method for Figuring Alloys, J. M. Quinn, *The Blast Furnace and Steel Plant*, April, 1923.

ferromanganese addition provided there is no oxidation of the alloy. Silicon calculation is $\frac{2000 \times 0.05}{50} = 2$ lb. ferrosilicon.

By the time the alloys are all calculated and weighed the steel should be nearly deoxidized, indicated by a series of chilled block samples. These test bars must show an entire absence of blow holes on the upper side exposed to the air on cooling, and should solidify entirely flat or slightly wrinkled, surface oxidation excepted. Even when there is an entire absence of blow holes and the upper surface of the test is slightly depressed or concave, the fracture must be observed closely for excessive shrinkage, for such a condition means an inferior metal for high-speed tools. This shrinkage is usually caused by too great a use of metallic deoxidizers during the working of a troublesome heat or where conditions were not normal.

All reactions of deoxidation are exothermic and consequently can only be completed when the components are in a condition of lowering their temperature. This is why it is essential to have the maximum temperature of the steel at the start of final deoxidation in the furnace but not at the time of tapping. At too high a temperature or on its rise, the steel can not be completely killed even in the presence of an excess of deoxidizing mediums, because there will be an equilibrium between the gases or oxides in the steel and the deoxidizers. Consequently, when cooling starts the reactions will readily be completed as the drop from the high temperature represents the best condition for all exothermic reactions. All of the deoxidation must proceed in the furnace, for when the steel is in the ladle the cooling is too rapid and the steel would be solidified before the completion of reactions and castings be inferior.

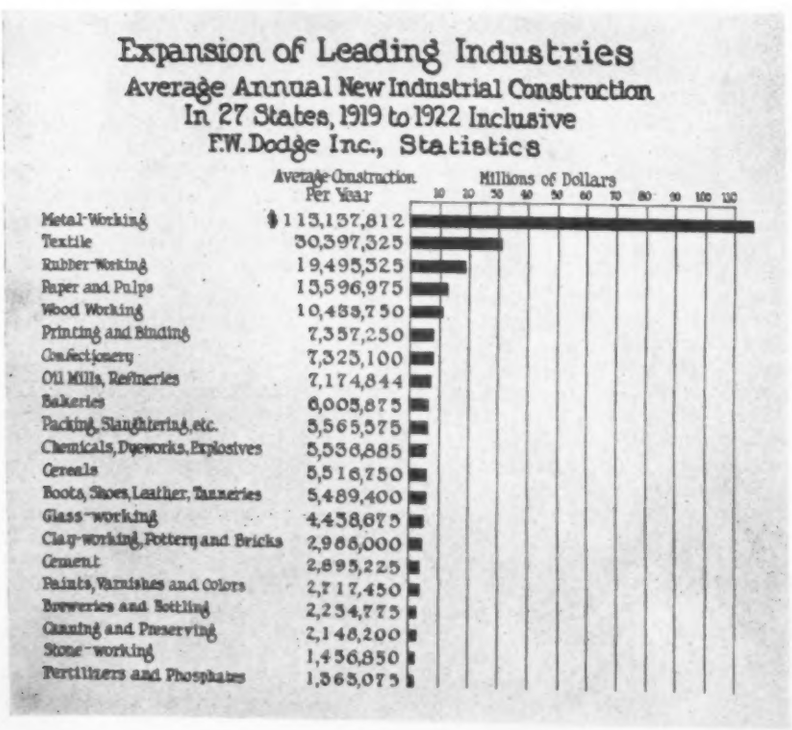
With the attaining of the proper temperature, correct analysis of metal and slag conditions, the power is cut down slightly. Then the alloys of manganese, silicon and vanadium are added to the bath in sealed containers to eliminate as much as possible their being mechanically entrapped in the slag. After a short time the metal is thoroughly stirred and a metal sample taken for observation which should show the steel about ready for pouring from the furnace.

At this time, further deoxidation of the steel was proceeded with by a process which can not be published and which made it possible to pour the metal into molds of tool form. However, when these further reactions had taken place the metal was poured into a bottom pour ladle to which some special alloys were added. The greatest care was taken to proportion the temperature during this last stage of the operation, for the steel, although not at its maximum of temperature, must be poured into the ladle very hot, to leave plenty of time for the necessary reactions to take place, and still enter the molds with sufficient liquidity. After these reactions ceased the metal was transferred to 100-lb. hand carried ladles, and when the proper temperature was obtained the metal was poured as quickly as possible. During the time the molds were being filled the film of oxide which forms on the top of the metal in the small ladles was prevented from entering the molds.

Molds and Heat Treatment

The molds for these castings are a special foundry proposition requiring the use of high-grade materials and great attention to details not often considered in regular foundry practice. A chilled molding system was developed where all sand washing was practically avoided, however, green sand, dry sand and cores with chill plates were used, depending on the type of tool to be made. It must be remembered that excessive segregation can be lessened and in some cases eliminated, provided the metal is reduced in cross section sufficiently, also the degree of segregation is dependent upon the initial casting temperature, rate of cooling from the liquid to solid state. This is one of the reasons why these small castings are less segregated than ingots.

The heat treatment of this steel follows the general practice of ordinary high-speed steel, except for the different ranges of temperatures because of the special analysis and also the quenching mediums used. The object of this heat treatment was to have all tools show a martinsitic structure under the microscope with a slight tendency to grade down to a troostitic structure. The photomicrographs, Fig. 1 of ordinary high-speed steel should be compared with Figs. 2, 3 and 4 of a cast high-speed steel cutter, the latter showing in general the structure obtained with this steel. The steel has the same structure in all planes and differs distinctly from forged or rolled stock which is fibrous. As a result, the strength and unique cutting qualities of this steel are the same in all directions.



WHILE the Metal-Working Industries Have No Monopoly on New Construction, This Chart Shows That They Accounted for More Building Operations in the Four Years Surveyed, Than the Sum of the Next Ten Manufacturing Groups in Point of Construction Activity. In fact, in the total building program of the 20 industries shown below, metal-working was only 28 per cent greater than that of the leading industry alone. That this should be the case, in view of the great war-expansion of metal-working plants and the post-war efforts to find outlet for the "excess" capacity thus created, is but another indication of the inherent strength of the machinery-building and other metal-working portions of our industrial structure

BLAST FURNACE RECORD

Number of Active Stacks Decreased by Twelve Compared with End of 1922

The end of the year finds 11 fewer blast furnaces in production in the Pittsburgh and nearby districts than at the end of 1922. In the area embraced, bounded by Johnstown and Erie, Pa., Dover, Ohio, and Wheeling, W. Va., there are now 117 steel works and 24 merchant furnaces. Of these 11 of the merchant stacks are in production, while iron is being produced in 81 of the steel works stacks. At the end of 1922 there were 142 furnaces, the Hall furnaces of the Republic Iron & Steel Co. at Sharon, Pa., having been dismantled in the past year. There were then in production 11 merchant furnaces and 92 steel works stacks.

The American Steel & Wire Co. has the same number of furnaces making iron as a year ago, as has also the National Tube Co. and the Carnegie Steel Co, although the active stacks of the latter are not the identical ones which were producing a year ago. The Jones & Laughlin Steel Corporation a year ago had all 12 of its furnaces making iron, as against nine now in production. Only one furnace of this company is cold, however, the two others being banked. The Republic Iron & Steel Co. has four furnaces making iron, the same number as a year ago, but the Youngstown Sheet & Tube Co., now having nine furnaces in the Youngstown district, as a result of its acquisition of the Brier Hill Steel Co., has five stacks in production against seven, the total of the two companies a year ago. The Pittsburgh Steel has one furnace in against two a year ago; the Bethlehem Steel Co., four in at Johnstown, Pa., against eight a year ago, and the Wheeling Steel Corporation, not including Portsmouth, Ohio, two, against three at the end of 1922.

Merchant furnaces idle now which were in production a year ago are those of the Clinton Iron & Steel Co., Pittsburgh, the Penn Iron & Steel Co., Canal Dover, Ohio; Reliance Coke & Furnace Co., Sharpsville, Pa.; one furnace of the Shenango Furnace Co., Sharpsville, Pa., and the Perry Iron Co., Erie, Pa. Merchant furnaces now producing, which were idle a year ago, include the stacks of the Sharpsville Furnace Co., Sharpsville, Pa.; the Stewart Furnace Co., Sharon, Pa.; the Adrian Furnace Co., Dubois, Pa., and two McKinney Steel Co. furnaces at Josephine, Pa.

The record of furnaces in production and out or banked at the close of the year makes the following comparison:

PITTSBURGH DISTRICT

Steel Works Furnaces

	Total	1923 In	1923 Out	1922 In	1922 Out
American Steel & Wire Co.—					
Donora, Pa.	2	1	1	1	1
Schoenberger	2	2	0	2	0
Carnegie Steel Co.—					
Carrie	7	7	0	7	0
Clairton	3	3	0	3	0
Duquesne	6	5	1	6	0
Edgar Thomson	11	9	2	7	4
Edith	1	0	1	0	1
Isabella	3	2	1	2	1
Lucy	2	0	2	1	1
Neville	1	1	0	1	0
Pittsburgh Crucible Steel Co.	2	1	1	1	1
Jones & Laughlin Steel Corporation—					
Aliquippa	5	5	0	5	0
Eliza	6	4	2	6	0
Soho	1	0	1	1	0
National Tube Co.	4	4	0	4	0
Pittsburgh Steel Co.	2	1	1	2	0
Merchant Furnaces					
Clinton Iron & Steel Co.	1	0	1	1	0
Total	59	45	14	50	9

MAHONING & SHENANGO VALLEY DISTRICTS

Steel Works Furnaces

Carnegie Steel Co.—					
Farrell	3	3	0	3	0
New Castle	4	2	2	4	0
Niles	1	0	1	0	1
Ohio	6	6	0	6	0
Sharon	1	0	1	0	1
Republic Iron & Steel Co.	7	4	3	*4	4
Sharon Steel Hoop Co.	1	1	0	1	0
Trumbull Cliffs Furnace Co.	1	1	0	1	0
Youngstown Sheet & Tube Co.	9	5	4	7	2
Merchant Furnaces					
A. M. Byers Co.	1	1	0	1	0
Hanna Furnace Co.—					
West Middlesex	1	0	1	0	1
Leetonia, Ohio	1	1	0	1	0
Dover, Ohio	1	0	1	1	0
Reliance Coke & Furnace Co.—					
West Middlesex, Pa.	1	0	1	0	1
Sharpsville, Pa.	1	0	1	1	0
McKeefrey Iron Co.	1	0	1	0	1
Sharpsville Furnace Co.	1	1	0	0	1
Shenango Furnace Co.	3	1	2	2	1
Struthers Furnace Co.	1	1	0	1	0
Stewart Furnace Co.	1	1	0	0	1
Valley Mold & Iron Corporation	1	0	1	0	1
Total	47	28	19	33	15

WESTERN PENNSYLVANIA

Steel Works Furnaces

Bethlehem Steel Co., Johnstown, Pa.	11	4	7	8	3
Merchant Furnaces					
Adrian Furnace Co., Dubois, Pa.	1	1	0	0	1
American Manganese Mfg. Co.	2	0	2	0	2
Kittaning Iron & Steel Mfg. Co.	1	0	1	0	1
McKinney Steel Co.—					
Scottdale, Pa.	1	1	0	1	0
Josephine, Pa.	2	2	0	0	2
Perry Iron Co.	1	0	1	1	0
Punxsutawney Furnace Co.	1	1	0	1	0
Total	20	9	11	11	9

WHEELING DISTRICT

Steel Works Furnaces

Carnegie Steel Co.—					
Bellaire, Ohio	2	2	0	0	2
Mingo, Ohio	4	3	1	3	1
Steubenville, Ohio	1	0	1	0	1
National Tube Co.	2	2	0	2	0
Wheeling Steel Corporation	5	2	3	3	2
Weirton Steel Co.	1	1	0	1	0
Total	15	10	5	9	6
Grand total	141	92	49	103	39

*One furnace dismantled since a year ago.

Immigration in Third Quarter

Returns from the Commissioner General of Immigration show that 263,259 immigrant aliens were admitted to the United States during July, August and September, while 20,603 emigrant aliens departed. The net gain in population, from this source, was thus 242,656. The rate of increase cannot of course be maintained, because several important sources, including Great Britain, have exhausted their annual quotas under the act of May 19, 1921.

Details of the in-and-out movement are shown in the table, which gives the monthly figures for the three months and the labor classification for the total. It will be noted that we gained 58,791 skilled laborers and 94,535 other workers. Included under "miscellaneous" were 40,384 "common" laborers admitted and 8172 departed, or a net gain of 32,212.

1923	Immigrant Aliens Admitted	Emigrant Aliens Departed	Net Gain
July	85,542	8,041	77,501
August	88,286	6,489	81,797
September	89,431	6,073	83,358
Third quarter	263,259	20,603	242,656
Of the above:			
Professional	9,023	658	8,365
Skilled labor	60,619	1,828	58,791
Miscellaneous	97,318	11,148	86,170
No occupation*	96,299	6,969	89,330

*Including women and children.

The Pittsburgh Steel Co. has blown out one of its two furnaces at Monessen, Pa., for relining, but this loss has been offset by the starting up of a furnace of the Bethlehem Steel Co. at Johnstown, Pa. Recent resumption of the Mattie furnace of the A. M. Byers Co., Girard, Ohio, brings the total number of furnaces in production at the present writing in Pittsburgh and nearby districts to 92 out of a total of 141, in the area bounded by Johnstown and Erie, Pa., Dover, Ohio, and Wheeling, W. Va.

BRITISH MARKET QUIET

Result of Election Induces Quiet—Settlement with Boilermakers Renews Shipyard Activity

LONDON, ENGLAND, Dec. 13.—Trading in iron and steel during the past fortnight has been rather upset by the general election and now that the result is known, still further quiet has set in. It must be remembered, however, that December is usually quiet in view of the fact that it witnesses the ending of the year, the approach of holidays, and a period of stock-taking. Purchases of pig iron have been heavy during the past month, chiefly on home account, a result of the cessation of the boilermakers' dispute releasing many shipyard contracts and sales have been made, in some instances covering deliveries for the whole of next year. Prices of all makes of pig iron are firm, particularly for hematite, where the tendency is still upward. A halt seems to have been called in the values of foundry pig, Cleveland G. M. B. remaining at about 100s. Hematite on the other hand is changing hands at as high as 102s. 6d. for delivery early next year. Output has recently been expanded by blowing in additional furnaces, but even this has failed to deflect values, and with home demand likely to expand, lower prices are hardly likely for some time to come.

In the finished iron and steel markets considerable improvement is noticeable in business with home consumers, plate mills in particular being busy, in some cases with order books still filled for two or three months ahead. During thirty weeks' idleness, caused by the boilermakers' dispute, the shipyards were inactive, but orders were steadily accumulating, and now that these have been released naturally there is a rush of business in plates and allied products. Ordinary merchant buying is light and export trade is also in a weak condition, there being little inclination on the part of foreign purchasers to enter into commitments, and even trade with Continental producers has suffered of late. Home trade prices are advancing, ship plates now being quoted up to £10 5s. a ton, makers showing an inclination to ask more money for export.

Among recent shipbuilding contracts is one placed by the Royal Mail Steam Packet Co., with Harland & Wolff of Belfast for two motor passenger liners of 22,000 tons gross. The Greek Government has awarded J. S. White & Co., of Cowes, Isle of Wight, contracts for the complete overhauling of machinery and constructional alterations on four Greek destroyers, while the Furness Shipbuilding Co. has secured Canadian contracts for two steamers of 2000 tons dead weight and for five oil carrying barges for the Imperial Oil Co., of Toronto. Launchings of Harland & Wolff this year total 101,823 gross tons, which is stated to be greater than any other firm in Great Britain and Ireland. This output includes high-power passenger steamers for the P. & O. and the Atlantic transport liner "Minnewaska," two single-screw steamers of about 7000 tons each for the British Mexican Petroleum Co., and one twin-screw Diesel engine vessel of 9500 tons for the Royal Mail Steam Packet Co.

Richard Thomas & Co., the largest tin plate manufacturers, recently issued their report covering the year ended Sept. 30, 1923. This shows that the net profit £311,219 is £71,575 larger than a year ago. The preference dividends absorbed £228,664, the ordinary dividend £82,281, and £163,593 was carried forward to the next accounts. In connection with the purchase by the company of the Grovesend Steel & Tin Plate Co., it is stated that the new shares offered in connection with the deal were practically all taken by the present shareholders of Richard Thomas & Co., the small balance not applied for being acquired by the directors who acted as sponsors for the issue.

Spur Gear Hobbing Machine

A No. 34 spur gear hobbing machine similar in general design to the No. 44 spur and spiral gear hobbing machine, described in THE IRON AGE of Oct. 25, has been added to the line of the Brown & Sharpe Mfg. Co., Providence. The machine is rated to hob spur gears up to 18 in. pitch diameter, 3 diametral pitch in cast iron or 4 d.p. in steel.

Simplicity of design, the ability to maintain accuracy over a long period and ease of operation are general features claimed. Special attention is said to have been given to the support of all gears, and spiral bevel gears are used where thought desirable. Low and compact design of the hob slide and swivel, bringing the hob spindle close to the ways, is intended to assure maximum rigidity. The work is supported by an overhanging arm as in the previous machine, and additional support is provided for heavy gears by an adjustable rim rest placed back of the work being cut, which takes the thrust of the hob. The No. 34 machine is also provided with the balance wheel, mounted directly on the hob spindle, for steadying the cutting action of both the hob and the machine, thereby eliminating chatter. The hob slide may be run back and forth by power when the hob is stationary, a feature emphasized as eliminating laborious hand operation. Hand wheels and control levers are located on the front of the machine and within easy reach.

The machine is self-contained and may be driven directly from the main line shaft to the single friction pulley. For motor drive, the motor is mounted on a bracket at the rear and geared direct to a friction gear on the main drive shaft. From the friction pulley the drive passes to the hob slide quick-return mechanism and then through the speed change gears. From these gears the drive goes forward to the hob spindle and index mechanism and then along the rear of the machine bed to the hob slide feed screw.

Ten changes of speed, from 45 to 165 r.p.m. in geometrical progression are provided for the hob spindle and provision for 1½ in. end adjustment of this spindle is included to permit using several sections of the hob before resharpening. Hobs up to 5 in. in diameter may be used and either a 1¼ or 1½ in. spindle may be provided. A 10 deg. adjustment of the hob swivel is provided for right-hand hobs only. A vernier reading to 5 min. permits of accurate setting. The index change gears permit of cutting all numbers of teeth from 6 to 50, and all numbers from 50 to 180 except prime numbers and their multiples.

The arrangement of the indexing mechanism is similar to that in the No. 44 machine and a hand wheel is provided on the index worm shaft to permit the worm to be operated by hand. This is intended to be of substantial value in recutting gears, as it has graduations to indicate the relative adjustment of the work arbor. The work spindle front end has a No. 16 B & S taper hole with a 2½ in. diameter hole through the center for holding shafts or work arbors, and is fitted to receive a faceplate or fixture.

Change gears give 12 changes in feed of the hob slide in geometrical progression from 0.025 to 0.153 in. per revolution of the work. After leaving the change gears the drive is through a worm and worm wheel, which turns free on the feed screw. A lever controls a clutch on the feed screw shaft; the clutch if thrown to one side engages the lead screw, and if thrown to the other connects the power quick return. The clutch also has a neutral position. The feed screw may be rotated in either direction by hand. A vertical lever at the top of the feed case operates another clutch and controls the rapid power advance, the power quick return being controlled by the horizontal lever. Both are operative when the hob is rotating or idle.

A motion picture film has been completed by the E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del., entitled "Dynamite at Work." The reels may be obtained upon application to the Du Pont company. Among other things there is a slow motion picture of a shot of some 45,000 lb. of dynamite in a quarry.

GERMAN SITUATION

Finish of Ruhr Struggle—Industry Adapting Itself to Changed Conditions—Working Overtime

BERLIN, GERMANY, Dec. 4.—With the signing of the agreement between the Mission Interalliée de Controle des Usines et des Mines and the representative of the Mining Association (Bergbaulicher Verein) at Düsseldorf, the Ruhr problem has entered a new phase. The agreement is of vast importance not only to the Ruhr district but also to the whole of Germany and may be compared with the Versailles treaty. With sufficient good will on both sides it may be the turning point toward a new and better era.

Conditions in the Ruhr districts have lately shown a great resemblance to those existing in November, 1918. About 2 million are out of work with another 1½ million on short time. The official cost of living index has increased to more than 50 per cent above the purchasing power of the mark but prices in the occupied area are higher than in other parts of Germany. The excitement among the crowded population reached the highest pitch when the Berlin Government had to declare that it was unable to continue to pay compensation to the industry to keep its employees at work. More dismissals of workmen took place then and the industrial leaders probably feared violent outbreaks of public resentment.

Unless the price of Ruhr coal can be kept at a level with British quotations, there is little possibility to keep the coal industry going. In consideration of the crisis the mine owners and the representatives of the employees have made an agreement that one hour overtime is to be worked in the Ruhr mines. For the other overground workers not directly connected with coal production a new arrangement is to be made in regard to working hours. One of the main factors is the question of transportation, as it will be some time before the railroads will be in full working order.

Conditions in the German engineering industry show no improvement. Customers are awaiting a clearing up of the situation especially in regard to the exchange problems. For some time the mark exchange has been fixed much higher at the Berlin bourse than abroad. Owing to this discrepancy and the fear that a further drop in the mark would take place, goldmark prices were raised all round and are in some cases three to four times pre-war level to cover the risk on papermark payments. Engineering firms have, however, hardly doubled their prices. The keen competition has kept prices low, and orders have been accepted on an unprofitable basis in order to get the means to carry on. The industry in the occupied area is greatly hampered by the export restrictions and the tax.

Difficulties in Restarting Ruhr Industries

There are many difficulties in the way of restarting the iron works on the Ruhr, and some time will elapse before anything like a normal working is attained. At some works the stock of ore is low and the scrap available has been considerably reduced by French requisitioning. For a full restarting of the works large amounts of raw material would have to be procured, but as railroad transport is still dislocated, sufficient supplies will only gradually be available. Producers of scrap have petitioned the Government to grant export permission, but owing to the prevailing scarcity this was refused. The sending of semi-finished material and rolled finished iron products to unoccupied Germany is prohibited by the occupation authorities and permission has to be procured in every case. Extensive informations concerning the goods and the respective business transaction have to be furnished with every application.

The Solingen hardware, cutlery and tool industry is also struggling against adverse conditions. Home and foreign orders are declining. Raw materials are far above pre-war level and wages have in most cases been put on a goldmark basis and range between 0.35-0.50 marks (8½ to 12 cents) per hour. The Solingen Chamber of Commerce has concluded an agreement with the Rhineland commission, which is reducing the export duty for several Solingen products to 2 per cent. There are indications of a better export demand and German firms have been cutting prices to get orders.

Some Slowing Down in Austria

In the Austrian iron industry the flow of orders that had come to the works on account of the Ruhr occupation has ebbed down, but inland demand has largely improved. The Alpine Montan Gesellschaft and the South Slavonian iron works have made an agreement to restrict competition, and similar agreements are under negotiation with Czechian works. The prices for German machinery being higher than Austrian quotations, many export orders are secured by Austrian firms against the competition of their principal rival. They are also holding the home market and German machinery is at present imported to a very small extent. The cessation of reparation deliveries of German machines to Slavonia is also increasing the demand. The Austrian output of iron and steel products during the present year has increased considerably.

Business Conditions as Indicated by Coal Statistics

Based on the industrial consumption of coal, the volume of business as a whole during the month of November settled back to the level recorded for the month of September, according to the latest bulletin of the fuel committee of the National Association of Purchasing Agents. However, when taking into consideration that during November there were two legal holidays leaving only 24 working days as compared with 27 in October, the committee finds that the average daily volume of business was on about the same level for both months.

Of the total number of reports received from consumers of industrial coal for November, 47 per cent indicated increases in business, 24 per cent remained stationary, and 29 per cent showed decreases as compared with the preceding month.

Many branches of industry engaged in producing commodities entering into the holiday trade and seasonal lines showed increases, while a considerable number of industries in the staple and standard lines remained stationary or eased off a little.

Stocks and production of reporting companies were as follows:

Estimated Stocks on Hand	Net Tons
Sept. 1, 1923	76,480,000
Oct. 1, 1923	77,620,000
Nov. 1, 1923	77,015,000
Dec. 1, 1923	75,269,000

	Net Tons Production	Estimated Consumption
Month of August	57,547,000	42,750,000
Month of September	49,527,000	39,700,000
Month of October	57,364,000	46,217,000
Month of November	51,075,000	39,720,000

(Of the November production 43,329,000 tons was soft coal and 7,746,000 tons hard coal.)

The stocks of hard and soft coal in commercial consumers' bins on Dec. 1 were approximately 1,746,000 tons less than on Nov. 1. Based on the rate of consumption in November the stocks on Dec. 1 were sufficient to meet the industrial requirements of the United States and Canada for 47 days on the average.

The total production of coal fell off approximately 6,289,000 tons during November. This lower production in a large measure is due to two legal holidays, and the celebration by the miners of several church holidays during the month. Anthracite production was also hampered by strikes in several of the larger operations.

The Interstate Commerce Commission at Washington has again postponed the effective date of its order in the assigned car case, this time to April 1. Announcement of the latest postponement was made last Saturday. Arguments in the case were completed recently.

Machinery Markets and News of the Works

HOLIDAY LULL

Many of the Prospective Machine-Tool Purchases Being Postponed

General Electric Co., Schenectady, One of the Largest Buyers of Past Week

A holiday lull settled over the machine-tool markets last week and salesmen were in most instances put off until after Jan. 1. The General Electric Co. closed for a number of machines for Schenectady and West Lynn, and is expected to come into the market shortly for equipment for its new switchboard plant now being built in Philadelphia.

There has been a little miscellaneous railroad buying, and more is expected soon. The Union Pacific will probably act this week upon a list recently issued which calls for about $50,000 worth o. shop tools. The Pennsylvania Railroad has pending an inquiry for 18 tools for a new shop at Sharpsburg, Pa.

Prospects for an increasing volume of business after the first of the year seem promising, providing business in general shows signs of improvement.

New York

NEW YORK, Dec. 24.

THE General Electric Co., Schenectady, N. Y., was one of the principal buyers of the past week, and further purchases from this source are expected soon for its new switchboard plant now being built in Philadelphia. Machine-tool sellers have many inquiries on hand, but prospective buyers have in most instances postponed action until after Jan. 1. Orders received in New York sales offices the past week include the following: Walter Scott & Co., Plainfield, N. J., 6-ft. radial drill; Michigan Alkali Co., Detroit, 6-in. spindle horizontal boring, drilling and milling machine; Chicago, Burlington & Quincy Railroad, 42-in. planer; Chicago Great Western Railroad, 60-in. vertical milling machine; side-head boring mill, American Car & Foundry Co.; Western Electric Co., Chicago, 5-ft. boring and turning mill.

Frank Feraro, 825 Blake Avenue, Brooklyn, is having plans drawn for a one-story plant, 50 x 100 ft., for the manufacture of pipe nipples and kindred products, to cost $21,000. Louis Schillinger, 167 Van Sicklen Avenue, is architect.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Jan. 8, for 18,000 sq. ft. of brass wire cloth for the Brooklyn Navy Yard, schedule 1717.

The Albany Hardware & Iron Co., 41 State Street, Albany, N. Y., has engaged Fuller & Robinson, 95 State Street, architects, to prepare plans for its proposed seven-story works and distributing plant, 120 x 200 ft., to cost approximately $500,000. William I. Baker is president.

The Chilean State Railways, 141 Broadway, New York, will be in the market for steel and metal products, and equipment, for estimated 1924 requirements, as per lists now available.

The National Biscuit Co., 85 Ninth Avenue, New York, has awarded a general contract to Isaac Beers, Times Building, for a one-story machine and repair shop, 110 x 175 ft., at 450-60 West Fifteenth Street, to cost $75,000. J. B. Terrance, Rutherford, N. J., is architect. R. E. Tomlinson is president.

V. Nogin, director of the All-Russian Co-Operative Society, Ltd., 136 Liberty Street, New York, has arrived in this city from Moscow, to purchase a quantity of textile transmission and other machinery for shipment to Russia.

The Department of Plants and Structures, Municipal Building, New York, has been granted an appropriation of $50,000 for the installation of equipment for a radio station in Central Park. Grover A. Whalen is commissioner.

The American & Foreign Power Co., Inc., has been organized under Maine laws by the Electric Bond & Share Co., 71 Broadway, New York, to be operated as one of its utility groups in foreign countries. Properties of the parent company in Cuba, Panama and Guatemala will be taken over and extended by the new organization, and other plants acquired. The company is capitalized with 520,000 shares of preferred stock, and 920,000 shares of common stock, no par value. An issue of 400,000 shares of the first noted, to aggregate $38,400,000, will be sold to carry out the project. S. Z. Mitchell, president of the parent company, will act in the same capacity for the new organization.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a mill to be constructed in Queensland, Australia, for the manufacture of wall board and kindred products from sugar cane waste, in which it is proposed to use American machinery and power equipment. The Australian Cotton Association is indirectly interested in the project. Reference No. 112213.

Morris Leavitt, 1195-97 Atlantic Avenue, Brooklyn, manufacturer of parquet flooring, has plans for a four-story addition at 71-83 Beaver Street, to cost $35,000. Adolph Goldberg, 164 Montague Street, is architect. Machinery will be electrically-operated.

Ovens, power equipment, conveying and other machinery will be installed in the new three-story baking plant to be established by the Wagner Pastry Co., 9 Vesey Street, Newark, N. J., at Long Island City, where a building recently erected by the Interstate Land Holding Co. has been purchased. It will cost $125,000. W. J. Biddle is president.

The Transit Commission, 49 Lafayette Street, New York, will use an appropriation of $1,000,000 for additional repair shops at the yards of the Interborough Rapid Transit Co., 148th Street, now in course of erection, including machinery. It is expected to have the structures completed next summer.

The W. & A. Fletcher Co., 1301 Hudson Street, Hoboken, N. J., operating a shipbuilding and repair plant, has acquired the business of the Empire Electric Welding & Repair Co., foot of Thirty-sixth Street, Brooklyn, and will take possession Jan. 1. The property will be remodeled for a branch ship repair works.

The Arthur B. Shepard Co., 1836 Euclid Avenue, Cleveland, manufacturer of fabricated steel buildings, has acquired 2½ acres at Irvington, N. J., heretofore held by Gould & Eberhardt, for a new branch plant. The initial works will be one-story, 50 x 200 ft.

The Newark Cutlery Mfg. Co., 360 Fourteenth Avenue, Newark, will commence the erection of a new plant on Cordier Street, Irvington, N. J., to cost $25,000.

The General Engineering & Management Corporation, 165 Broadway, New York, will install an electrically-operated pumping plant with capacity of 2,000,000 gal. per day at Lakewood, N. J., in connection with a new sewerage treatment plant. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers.

The National Light & Electric Co., 291 Market Street, Newark, manufacturer of wireless and electrical equipment, has purchased property at 61-63 Lafayette Street, adjoining a four-story structure on Mulberry Street, acquired several months ago, for extensions.

The Interflash Signal Corporation, 120 Broadway, New York, manufacturer of railroad and highway signal devices, has leased a portion of the building at Plane and Augusta Streets, Newark, for a new plant, primarily for parts manufacture and assembling.

The Maccar Truck Co., Scranton, Pa., is establishing a factory branch at Sixth Avenue and Twelfth Street, Newark, totaling 14,000 sq. ft. of floor space, to include parts department and repair shop. Bertram W. Wright will be in charge.

The Packard Motor Car Co., Broad and Kinney Streets, Newark, has leased the two-story building, 150 x 155 ft., at Central Avenue and Hoyt Street, for a new service and repair branch.

The Lackawanna Laundry Co., 33 High Street, Newark, will install power, conveying and other machinery in a two-story addition, estimated to cost $95,000, for which plans are being drawn by Neil J. Convery, 942 Broad Street, architect.

An electrically-operated pumping plant will be installed by the Common Council, Westmont, N. J., in connection with a new sewerage disposal works, estimated to cost $60,000. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers.

New England

BOSTON, Dec. 24.

BUYING of machine tools continues on a small scale. The most recent purchases include a 6-in. vertical shaper by the General Electric Co., West Lynn, Mass.; 24-in. x 10 ft. lathe by the Taunton-New Bedford Copper Co., New Bedford, Mass.; 30 x 60 x 17 gap lathe by the Charlestown Navy Yard, Boston; large horizontal boring machine costing the Massachusetts buying more than $7,000; new disk grinding and miscellaneous used turning tools by a South Boston manufacturer, and odd lots of single machines. Anything even suggesting a list has been put over until after Jan. 1. Machine tool dealers and manufacturers in general will do considerably better in 1923 than in 1922, notwithstanding the inactivity during the past two months.

Small tools have sold well this month, although the past week has witnessed a letdown in orders.

The mechanical equipment of Stevens-Duryea, Inc., Chicopee, Mass., automobiles will be sold at public auction. The buildings will not be included. The plant was sold by receivers in October to a syndicate headed by R. M. Owen, New York.

Fred Drew, Brockton Last Co., Brockton, Mass., has taken over the recently liquidated Boston Last Co., heating appliances for shoe manufacturers, and has leased part of the G. G. Roberts Corporation tack factory, South Avenue, Whitman, Mass., under the name of the Boston Electrical Heating Corporation. The new firm is in the market for mechanical equipment and expects to begin operations shortly after the new year.

The Westinghouse Electric & Mfg. Co., East Springfield, Mass., has received a $1,500,000 order from the Radio Corporation, which includes radio receiving sets of new design. Work will start immediately and the operating force at the East Springfield plant will be increased.

Work is well under way on the erection of one-story wood-working shop for John D. McPhee Co., 124 Western Avenue, Brighton, Boston. Plans are private.

Foundations are in for a one-story, 54 x 60 ft. foundry and one-story, 15 x 30 ft. extension for the William J. Collins Foundry Co., Inc., Milford, Mass. to cost $10,000. W. J. Collins is in charge of the work.

Bids close this week for a $700,000 high school to be erected in Tudor Street, Chelsea, Mass., three-stories, 230 x 232 ft., to contain a machine shop and manual training departments. S. S. Eisenberg, 46 Cornhill, Boston, is the architect.

Plans are being prepared by John A. Stevens, Lowell, Mass., engineer, for a new power plant for the Draper Corporation, Hopedale, Mass., textile machinery.

The Central Maine Power Co. has been authorized by the Maine public utilities commission to issue $749,700 7 per cent preferred stock. Of this amount $600,000 will be used for future expenditures, $47,000 for sinking fund retirements, $5,000 for the retirement of second mortgage bonds and the remainder for the purchase of land and water rights at Skowhegan.

Contract has been awarded by the Pressed Metal Co., Providence, R. I., recently organized, to the Rowley Construction Co., Central Avenue, for a one-story plant, 107 x 265 ft., on Campbell Street, to cost $150,000. It will manufacture automobile parts. The company is headed by Darius Goff, Frank J. Powers and D. W. Flint, Cranston, R. I.

The Haverhill Electric Co., Haverhill, Mass., will make extensions in its power house at 161-65 Water Street, 75 x 91 ft., estimated to cost $35,000. Charles H. Tenney & Co., 200 Devonshire Street, Boston, are engineers.

A power plant will be constructed by the Sayles Finishing Plants, Inc., Saylesville, R. I., at its proposed textile mill near Asheville, N. C., estimated to cost $2,000,000.

The Franklin Light & Power Co., Farmington, Me., has purchased a site on the Carabasset River, North Anson, Me., for a hydroelectric power plant, with initial output of about 40,000 hp., to cost $125,000, including power dam, etc.

Motors, controls, conveying and other machinery will be installed in the four-story and basement printing plant, 60 x 100 ft., to be erected by the *Waterbury American-Republican, Inc.*, Waterbury, Conn., to cost $200,000, for which bids are being asked on general contract. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects and engineers.

New interests have acquired the plant and business of the New Haven Copper Co., Seymour, Conn., operating with a capital of $200,000, and will take immediate possession. Plans are being considered for improvements and the installation of additional equipment.

The Boston Sand & Gravel Co., 300 Condor Street, East Boston, is planning for the installation of an electrically-operated coal hoist and tower, with bucket about 1½ yd. capacity.

Work is under way on a two-story automobile service and repair shop for municipal automobiles at Board and Rollstone Streets, Fitchburg, Mass., with other municipal shops, 44 x 110 ft., 60 x 66 ft., and 30 x 60 ft., to cost $100,000. The City Council is in charge. H. A. Foster, 78 Fox Street, is architect.

A State charter has been issued to the New England High Carbon Wire Co., Millbury, Mass., with capital of $50,000 and 1100 shares of stock, no par value. It has recently acquired the former plant of the Millbury Rubber Co., and will install equipment for the manufacture of wire and metal products. Carl Thure Lund, 4 Stebbins Street, Worcester, Mass., is president and treasurer. Albert W. Blackmer is also interested in the company.

The Boston & Maine Railroad Co., North Station, Boston, will arrange a list of equipment for installation in its proposed power house at Worcester, Mass., to cost about $65,000. A. W. Munster is purchasing agent.

Philadelphia

PHILADELPHIA, Dec. 24.

AN expansion program has been arranged by the Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, including the construction of two generating plants in the city and one at Chester, Pa., to cost more than $5,000,000, with machinery. Work on the Chester station has commenced. Bids will soon be asked for a power substation on North Eleventh Street, for which plans are being drawn by John T. Windrim, Commonwealth Building, architect.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is taking bids on general contract for rebuilding the portion of its Pavonia car and locomotive shops at Camden, N. J., destroyed by fire several weeks ago, with loss of more than $150,000 including equipment.

E. F. Houghton & Co., 240 West Somerset Street, Philadelphia, manufacturers of lubricating oils, etc., have filed plans for a three-story addition at Third and Somerset Streets, to cost $75,000.

The Electric Development & Machine Co., 221 North Twenty-third Street, Philadelphia, has arranged a fund of $75,000 for the erection of its proposed plant at Shelmire and Edmund Streets.

The Congoleum Co., Inc., Morris Building, Philadelphia, plans the construction of a one-story power house at its new one- and three-story plant, 103 x 120 ft., and 65 x 100 ft., at Salem, N. J., estimated to cost $100,000, for which a general contract has been awarded to the Austin Co., Jefferson Building.

Work will commence on a power house at Fifth and Bristol Streets, Philadelphia, for the Brandle & Smith Co., Eighth and Dauphin Streets, confectioners, to cost $95,000, with equipment.

C. Stanton, 1201 Providence Road, Scranton, Pa., is having plans drawn for a four-story automobile service and repair building to cost approximately $350,000, including equipment. Lester Davis, 616 Spruce Street, is architect.

The Counties Gas & Electric Co., Ardmore, Pa., has work in progress on a new steam-operated electric generating plant at Barbadoes Island, Norristown, Pa., with capacity of 50,000 kw., and will triple the output of the station later.

The Pennsylvania Railroad Co., Altoona, Pa., has preliminary plans for two additional shops at Juniata.

Manual training equipment will be installed in the three-story high school to be erected at Palmerton, Pa., for which revised plans are being prepared, estimated to cost $175,000. W. H. Lee, Fifteenth and Race Streets, Philadelphia, is architect.

The E. Tiffany Co., Main and Franklin Streets, Hallstead, Pa., plans a new factory for the manufacture of trimming shears for trees and kindred specialties.

Fire, Dec. 15, destroyed a portion of the oil storage and distributing plant of the Butler Oil Sales Co., Sunbury, Pa., with loss estimated at $55,000 including equipment. It is planned to rebuild.

The Crane Market

Few new inquiries for either overhead traveling cranes or locomotive cranes have appeared in the past week and orders not yet placed are expected to be carried over to the new year. An inquiry that has been pending for some time was suddenly issued last week with a closing date of Dec. 26 specified. This was the list of the Western Electric Co., for Kearny, N. J. and included a 30-ton, 42-ft. 6½-in. span, 4-motor; 20-ton, 19-ft. 8-in. span, 3-motor; 25-ton, 46-ft. 2¼-in. span, 3-motor, with alternate on 4-motor; two 5-ton, 46-ft. 2¼-in. spans, 3-motor; a 5-ton, 12-ft. 9⅝-in. span hand power; and a ½-ton, 46-ft. 8-in. span, 1-motor crane. Among current locomotive crane inquiries is one from the Baltimore & Ohio Railroad, Baltimore, Md., for a list of six locomotive cranes.

Among recent purchases are:

Charles Wagner Construction Co., Jersey City, N. J., a 25-ton bucket handling locomotive crane from the Browning Co.

American Brake Shoe & Foundry Co., West Mah Wah, N. J., a 20-ton locomotive crane from the Ohio Locomotive Crane Co.

Boston Elevated Railway Co., Boston, Mass., a 10-ton special electric locomotive crane from the Industrial Works.

Babcock & Wilcox Co., Bayonne, N. J., a 17½-ton locomotive crane from the Industrial Works.

Interstate Iron & Steel Co., Chicago, a 27-ton, 55-ft. boom, locomotive crane from the Industrial Works.

Lehigh Structural Steel Co., Philadelphia, a 5-ton electric traveling crane from the Pawling & Harnischfeger Co.

New York Central & Hudson River Railroad, a 5-ton, 35-ft. span, 1-motor, overhead traveling crane for Selkirk, N. Y., from the Whiting Corporation.

Lehigh-Portland Cement Co., Allentown, Pa., a 25-ton, 60-ft. span, 3-motor overhead crane for power house installation at Mason City, Iowa, from the Northern Engineering Works.

Stone & Webster, Boston, Mass., a 10-ton, 79-ft. 1½-in. span electric crane for Phillipsdale, R. I., from the Northern Engineering Works.

Nickel Plate Railroad, Cleveland, Ohio, a 5-ton, 21-ft. radius, electric jib crane for installation at Cleveland, from the Whiting Corporation.

General Electric Co., Schenectady, N. Y., three 5-ton electric cranes for Schenectady, from Alfred Box & Co.

Northwestern Pacific Railroad, San Francisco, a 15-ton, 60-ft. span, 3-motor, overhead traveling crane from the Whiting Corporation.

Government of the Philippines, four 2-ton and one 15-ton gantry crane for Manila from the Wellman-Seaver-Morgan Co.

Manual training equipment will be installed in the two-story and basement high school to be erected at Avalon, Pa., estimated to cost $190,000, for which bids will be called on a general contract about Jan. 2. Maurice E. Kressly, 13 North Fourth Street, Harrisburg, Pa., is architect.

The B. F. Campbell Thermometer Works, Catasaqua, Pa., are perfecting plans for a factory to manufacture precision thermometers and equipment.

Following the construction of its new generating station with capacity of 25,000 kw., now under way at Saxton, Pa., the Penn Central Power Co., Altoona, Pa., plans the erection of additional units for an ultimate output of 80,000 kw.

Baking and power equipment, conveying and automatic machinery will be installed in the new confectionery plant to be established at Philadelphia, by the J. N. Collins Co., Minneapolis, Minn. The former mill of the Wilson Thread Co., Horrocks and Orthodox streets, has been acquired and will be remodeled.

The East Penn Electric Co., Pottsville, Pa., is concluding negotiations for the purchase of nearby light and power companies for expansion. Arrangements are being made for a generating plant on the Juniata River, near Iroquois, Pa.

The Board of Education, Forty Fort, Pa., has engaged Ralph M. Herr, Simon Long Building, Wilkes-Barre, Pa., architect, to prepare plans for a two-story and basement high school, with manual training department, to cost $300,000.

Buffalo

BUFFALO, Dec. 24.

A BOND issue of $1,183,000 is being sold by the Northern New York Utilities, Inc., Watertown, N. Y., a portion of the proceeds to be used for a 10,000 hp. hydroelectric power plant, and 6700 hp., steam-operated generating station. J. N. Carlisle is president.

The Goodene Bank & Service Co., M. Goodene, president, Hayne Building, Elkhart, Ind., manufacturer of metal fixtures, etc., has preliminary plans for a new two-story and basement factory at Buffalo, 150 x 200 ft., estimated to cost $100,000. E. J. Ellis, 215 North Michigan Street, Elkhart, is architect.

The City Council, Gouverneur, N. Y., has engaged L. Reynolds, Geneva, N. Y., engineer, to prepare plans for its proposed power plant and pumping station, estimated to cost $75,000.

The Penn Spring Works, Lock Street, Baldwinsville, N. Y., manufacturer of automobile springs and bumpers, has plans for an addition. New machinery will be installed.

The Star Dry Cleaning Co., 1205 Genesee Street, Syracuse, N. Y., will take bids at once for a one-story power house, 30 x 38 ft., to cost $30,000. Paul Wolter, Welting Building, is architect.

Manual training equipment will be installed in the three-story high school to be erected at Hamburg, N. Y., for which bids will be asked on revised plans about Jan. 2, estimated to cost $350,000. Frank Spangenberg, 250 Delaware Avenue, Buffalo, is architect.

B. H. Rogers, Penn Yan, N. Y., will arrange a list of machinery to be installed in a plant to manufacture building materials, including tools, power and transmission apparatus.

The Beechnut Packing Co., Canajoharie, N. Y., has awarded a contract to the Morton C. Tuttle Co., Park Square Building, Boston, for the erection of a four-story addition, 60 x 100 ft., to cost approximately $125,000.

Cincinnati

CINCINNATI, Dec. 24.

INQUIRY continues heavy and buying is also being maintained at a fair rate. Heavy tools, such as planers and boring mills, have been in good demand and some large orders have been placed recently. Among purchasers of planers and boring mills are the Ramapo Iron Works, Pettibone-Mullikin Co., Westinghouse Electric & Mfg. Co., Thomas Elevator Co. and the Nash Motors Co. Local dealers report buying holding up fairly well, though demand is usually for the smaller tools. Second-hand machinery is also fairly active.

A number of railroads are now negotiating for tools, and some of the lists are expected to close within the next week or two. The Louisville & Nashville is understood to be preparing a list for a machine shop to be erected in Alabama. The Sante Fé has issued an inquiry for two engine lathes, and is expected to issue a large inquiry for miscellaneous shop equipment shortly after the new year.

Prices generally are being well maintained, on both new and used equipment.

The Gramm-Bernstein Motor Truck Co., Lima, Ohio, has been purchased by a syndicate headed by E. J. Marshall, Toledo, which contemplates reorganization of the company. The plant will continue to build motor trucks.

The Kilgore Mfg. Co., Westerville, Ohio, manufacturer of toy pistols and caps, was gutted by fire Dec. 14. The assembly plant, general offices and storage building were destroyed, the loss amounting to approximately $50,000. Temporary quarters have been secured and manufacturing operations have been resumed. The company will rebuild as soon as possible, according to H. H. Watkins, general manager.

The Duro Pump & Mfg. Co., Dayton, Ohio, manufacturer of pumps and water supply system, is having plans prepared for an addition to its plant on Amelia Street. The cost of the improvement will be approximately $200,000, including equipment. Schenck & Williams are the architects.

The Louisville Hydro-Electric Co., 321 West Chestnut Street, Louisville, is perfecting plans for a new hydroelectric generating plant to cost about $1,500,000 with machinery and transmission system. D. McDonald is engineer.

The Hoshall Machinery Co., P. O. Box 187, Memphis,

Tenn., has inquiries out for a 150 kw. generator, direct-connected to automatic engine, three-phase, 60 cycle.

The Sanford-Day Iron Works, Inc., Knoxville, Tenn., recently organized under Delaware laws with capital of $480,000, will take over and expand the plant of the company of the same name.

The Standard Oil Co., Toledo, Ohio, has tentative plans for additional units at its refinery in the East Side section, to cost more than $2,000,000 with machinery and power equipment.

The Public Light & Power Co., Chattanooga, Tenn., plans the installation of additional equipment at its hydro-electric generating plant at Shelbyville, Tenn.

South Atlantic States

BALTIMORE, Dec. 24.

Purchase has been made by the Holtson Mfg. Corporation, 119 East York Street, Baltimore, recently organized, of the former works of Unger & Hopf. The property will be remodeled for the manufacture of oil burners and oil-burning apparatus. James B. Holtson is president.

The Appalachian Power Co., 31 Nassau Street, New York, has engaged Ville, Blackwell & Buck, 49 Wall Street, engineers, to prepare plans for a new electric power house at Glenlyn, Va., with capacity of 60,000 kw., to cost approximately $1,750,000 with transmission system.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a Scotch type boiler, 250 to 300 hp.; two 150-hp. return tubular boilers, and auxiliary equipment; 100-hp. motor, and one 75-hp. motor, each three-phase, 60-cycle, 220 volts; one 18 to 20-in. mechanical extractor for laundry service.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Jan. 8 for 20,000-ft. two-conductor cable, schedule 1707; a quantity of plastic fire brick material, schedule 1714; until Jan. 15 for 26,200 ft. steel pipe for the Norfolk, Va., and Mare Island navy yards, schedule 1718; 9,000 composition nipples, schedule 1721, and for a quantity of brass machine screw nuts, schedule 1722, both for the Mare Island Navy Yard.

The Southern Power Co., Charlotte, N. C., has taken options on property near Spartanburg, S. C., as a site for a new steam-operated electric generating plant, to cost about $250,000.

The Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, Washington, will receive catalogs and price lists of machinery for cutting timber into railway ties, for reforwarding to the branch office at Rio de Janeiro, Brazil, which has received inquiries for American machinery of this character.

The Puritan Brick Co., Aberdeen, Md., recently organized with a capital of $225,000, has plans for a new plant, with power house and machine shop, estimated to cost $100,000. George Hays Mitchell, Aberdeen, is one of the heads of the company.

The Ansley Lumber Co., Estill, S. C., has inquiries out for a 50-kw. generator and auxiliary equipment.

The Austell Cabinet Co., Austell, Ga., lately formed to build a local plant, is in the market for an engine, boiler, motors and other power and operating machinery. A. B. Harrington is one of the heads of the company; W. F. Collier is construction engineer in charge.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a mechanical cotton baler, second-hand, good condition; one 30 to 40-hp. motor, and one 30-in. solid curb extractor.

The Washington Gas Co., Washington, N. C., will build a steam power house and install generating equipment at its proposed artificial gas plant at Kinston, N. C., estimated to cost $100,000 with machinery.

E. L. Williams, Pelham, Ga., is in the market for machinery for a saw mill, including 50 to 75-hp. engine, boiler and auxiliary power equipment.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a company at Pizen, Czechoslovakia, in the market for American machinery for the manufacture of wire and wire-fencing, and for pin and safety pin manufacturing machines, No. 8521; of a company at Chihuahua, Mexico, desiring match-manufacturing machinery, No. 8549; a concern at Ciudad Juarez, Mexico, in the market for machinery for wire nail manufacture, No. 8546; a company at Johannesburg, South Africa, for machinery for the manufacture of greases, oils, soaps, etc., No. 8517; a company at Algiers, Algeria for mining machinery and tools, No. 8548; and a concern at St. Michael, Azores, for feed grinders and crushers, and machinery for handling vegetable fibre, No. 8502.

Bids will be received by the Commissioners of the District of Columbia, District Building, Washington, until Jan. 12, for one boiler, return tubular, self-contained, in steel casing with firebrick lining.

The Muriel Lumber Co. Wadesboro, S. C., recently formed with a capital of $100,000, is planning the installation of saw mill machinery, planers and woodworking equipment in a local building. The company will also purchase a boiler, engine and auxiliary power equipment. L. D. Robinson is president.

The Pine Waste Products Co., Inc., Stamford, Conn., has tentative plans for a new pulp and paper mill on site in Georgia, location to be given out later, to cost in excess of $100,000, with machinery.

Bids will be received by the General Purchasing Officer, Panama Canal, until Jan. 11, for pinions, switchboards, air compressor steel conduit, electric motor storage batteries, insulated cable, screws, nuts, rivets, chain bolts, pipe jointers, and other equipment, circular 1531.

Chicago

CHICAGO, Dec. 24.

THE International Harvester Co., 606 South Michigan Avenue, Chicago, has preliminary plans for new branch works on Chester Street, Chattanooga, Tenn., adjoining its present plant, to cost close to $100,000 with equipment.

Manual training equipment will be installed in the proposed three-story high school to be erected at Deadwood, S. D., estimated to cost $250,000, for which bids will soon be asked on a general contract. Perkins & McWayne, Paulton Building, Sioux Falls, S. D., are architects.

The Common Council, New Prague, Minn., has tentative plans for a new municipal electric light and power plant, estimated to cost $75,000. E. E. Budin is city clerk.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, is disposing of a bond issue of $15,000,000, a part of the proceeds to be used in connection with an expansion program next year.

The Ford Motor Co., Highland Park, Detroit, is having revised plans drawn for a one-story machine shop, 45 x 100 ft., at Torrence Avenue and 128th Street, Chicago, to cost approximately $40,000. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Wisconsin Railway, Light & Power Co., Winona, Minn., will make extensions and improvements in its power plant and building at Third and Lafayette Streets, to cost $60,000.

Manual training equipment will be installed in the new two-story high school to be erected at Belleville, Ill., estimated to cost $200,000, for which foundations will soon be laid. The Board of Education is in charge.

The Des Moines Electric Co., Des Moines, Iowa, is perfecting plans for a new steam-operated electric generating plant at the junction of the Des Moines and Raccoon Rivers, with initial capacity of 35,500 hp., divided into two units, estimated to cost $5,000,000. Later the station will be increased, with total cost estimated at $15,000,000. The company is a subsidiary of the Illinois Power & Light Corporation, Chicago.

A manual training department will be installed in the new four-story high school to be erected at Joliet, Ill., estimated to cost $500,000, for which foundations will soon be laid. The Board of Education is in charge.

Pittsburgh

PITTSBURGH, Dec. 24.

TENTATIVE plans are being arranged by the Phillips Mine & Mill Supply Co., 2227 Jane Street, Pittsburgh, for the erection of a new factory to cost $100,000, replacing a portion of the works recently destroyed by fire. J. M. Phillips is head.

The Duquesne Light Co., Chamber of Commerce Building, Pittsburgh, has plans for four new power substations, to cost approximately $400,000 with machinery.

The Consolidation Coal Co., 67 Wall Street, New York, is arranging for a preferred stock issue of $10,000,000, a portion of the proceeds to be used for extensions in its properties in West Virginia and the installation of additional equipment.

The Pittsburgh Sheet Glass Co., Tylerdale, Pa., has work in progress on a new plant to cost $700,000 with machinery. A power house and machine shop will be included.

The Wardensville Paint & Mineral Co., Wardensville, W. Va., will break ground early in the new year for several

additions, estimated to cost $40,000 including machinery. E. H. Ranck is president.

The Buckeye Steam Coal Co., Arrott Building, Pittsburgh, has plans for a new tipple and hoisting plant to cost about $90,000.

The Standard Seamless Tube Co., 313 Sixth Avenue, Pittsburgh, has awarded a general contract to the McClintic-Marshall Co., for a one-story addition at Ambridge, Pa., 80 x 500 ft., to cost $95,000. J. B. Wharton is structural engineer for the company.

The West Penn Power Co., West Penn Building, Pittsburgh, is disposing of a bond issue of $7,500,000, a portion of the proceeds to be used for extensions and equipment, including additions to the generating station at Springdale, now in progress. A. M. Lynn is president.

The Coal River & Eastern Railway Co., Seth, W. Va., recently organized with capital of $1,000,000 to build a new line from Seth to Ashford, W. Va., about 16 miles, plans the erection of a locomotive and car repair shop. The company is headed by George B. Hooper and Laurence E. Clark, both of 308 Euclid Avenue, Cleveland.

The Westmoreland Specialty Glass Works, Jeannette, Pa., has extensions in progress to double the capacity of the plant, costing more than $100,000, with equipment.

The Carnegie Coal Co., Carnegie, Pa., has been formed with a capital of $1,750,000 to take over and consolidate the company of the same name with the Wabash Coal Co., Verner Coal & Coke Co., and the Burgettstown Coal Co. Plans are being developed for extensions, and the installation of additional equipment.

The Pennsylvania-Overland Co., 713 Railroad Street, Johnstown, Pa., local representative for the Overland automobile, is taking bids for a two-story service and repair building to cost $65,000.

The Junior Pocahontas Coal Co., Welch, W. Va., has tentative plans for a new power house to replace a structure recently destroyed by fire.

Gulf States

BIRMINGHAM, Dec. 24.

PLANS are being drawn by the L. Harrington Co., Houston Building, San Antonio, Tex., engineer, for a new rock crushing plant at Salado, Tex., for a company whose name is temporarily withheld. It will include a plant, elevating machinery, washing plant, screens, etc., and power house, and cost $90,000.

The Marianna Light & Power Co., Marianna, Fla., has engaged the Southern Engineering Corporation, Albany, Ga., engineer, to prepare plans for a hydroelectric generating plant on the Chipola River, estimated to cost $250,000, with power dam and transmission system. G. M. Thomas is managing director.

The Fisher Supply Co., Dallas, Tex., pipe and plumbing equipment, has commenced the erection of a new storage and distributing plant on South Harwood Street, one-story, L-shape, 40 x 170 ft., with pipe yard, 90 x 127 ft., estimated to cost $45,000. Hoisting, conveying and other equipment will be installed. Flint & Broad, Dallas, are architects.

Wood Brothers, Graham, Tex., C. L. Wood, head, have purchased property at Fifth Avenue and Tenth Street, St. Petersburg, Fla., 125 x 140 ft., as a site for a new ice-manufacturing and cold storage plant, to cost $250,000 including machinery.

Bids will be received by F. M. Pepper, city clerk, Belzoni, Miss., until Jan. 10, for equipment for a municipal power plant and waterworks, including two 200 kw. turbines and generators; two 300 hp. watertube boilers; coal conveying machinery; two 500 gal. per min. motor-driven centrifugal pumps; one 500-gal. motor-driven pump; one 1000-gal. motor-driven fire pump; two centrifugal pumps for boiler feed, turbine driven; one 1000-gal. steam-driven fire pump; two 350 to 400 hp. full Diesel oil engines, with generators; 8-panel switchboard and auxiliary equipment. J. J. Sisloff is superintendent of the water and light department.

Bids will be received by C. J. Ryan, city manager, Fort Pierce, Fla., until Jan. 9, for one electrically-operated distilled water ice-manufacturing plant, 20 tons, daily capacity, for municipal service.

The Ford Motor Co., Highland Park, Detroit, has increased its holdings at Jacksonville, Fla., to a total of 9½ acres of waterfront land, and has plans for a new automobile assembling works, estimated to cost $350,000 with machinery.

The Texas & Pacific Railroad Co., Dallas, Tex., has preliminary plans for new engine shops, engine house, car works and other structures, with power house, at Belt Junction, estimated to cost $750,000, with machinery.

Edward Frederick, 802 East Commerce Street, San Antonio, Tex., has plans for a new factory to manufacture store fixtures and kindred equipment, with electrically-operated machinery, estimated to cost $35,000.

Electric pumping machinery will be installed by the City Council, Meridian, Miss., in connection with proposed improvements at the municipal waterworks to cost $80,000, for which a bond issue will be arranged.

The Board of Education, St. Augustine, Fla., has selected Fred A. Henderich, St. Augustine, architect, to prepare plans for a new high school on Hastings Street, and junior high school for negroes, with manual training departments. A portion of a bond issue of $300,000, will be used for the structures.

The Common Council, Mart, Tex., is arranging a bond issue of $150,000, for a waterworks system and the installation of electric pumping machinery. Koch & Fowler, Central Bank Building, Dallas, Tex., are engineers.

Electric power equipment, elevating and conveying machinery, loading and other equipment will be installed in the grain elevator to be erected by the Kansas City Southern Railway Co., Kansas City, Mo., at Port Arthur, Tex., to cost close to $500,000 with machinery. A. N. Reese, Port Arthur, is engineer.

The City Council, Port Arthur, Tex., is having plans drawn for extensions in the municipal waterworks and the installation of electrically-operated pumping units, estimated to cost $900,000. M. C. Erwin is city engineer.

The F. B. White Typewriter Co., Inc., 327 North Oregon Street, El Paso, Tex., recently organized, has leased a building and will establish a plant for typewriter parts production, rebuilding and repairs. Equipment will be installed at once. F. B. White is president and general manager.

Pacific Coast

SAN FRANCISCO, Dec. 19.

BIDS will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Jan. 8, for machine tools for the naval station, San Diego, Cal., schedule 1696.

C. H. Warner, San Gabriel, Cal., inventor of the Warner speedometer, and associates have organized the American Liquid Meter Co., with capital of $500,000, specializing in the manufacture of liquid measuring equipment. Property has been secured at Alhambra, Cal., for a new plant, estimated to cost $100,000 with machinery. The initial unit will approximate 10,000 sq. ft., and other buildings will be erected later. Mr. Warner will be vice-president.

The National Paper Products Co., 1789 Montgomery Street, San Francisco, affiliated with the Zellerbach Paper Co., 534 Battery Street, is perfecting plans for the initial unit of its plants at Los Angeles, estimated to cost $1,200,000. A power house and machine shop will be built.

The R. E. Borbeck Co., Los Angeles, has negotiations under way with the Chamber of Commerce, Watts, Cal., for a site for a new plant to manufacture tile products, estimated to cost $75,000 with machinery.

The Southern Sierras Power Co., Riverside, Cal., will commence work in January on a hydroelectric generating plant on the Owens River Gorge, Mono County, estimated to cost $500,000 with transmission system. A. B. West is president.

Manual training equipment will be installed in the new junior high school to be erected at San Bernardino, Cal., at Eighth and E Streets, estimated to cost $230,000. The Board of Education is in charge.

The National Ice & Cold Storage Co., Riverside, Cal., will commence the erection of a two-story addition to its cold storage building, estimated to cost $45,000 with equipment. George T. Roberts is general manager.

The Common Council, Nampa, Idaho, is planning the construction of a municipal electric power plant, estimated to cost $85,000 including equipment.

The Orange County Lumber & Box Co., Newport Beach, Cal., recently organized with a capital of $200,000, plans the construction of a power house at its proposed mill on 30-acre tract lately purchased. The plant will cost about $100,000 with equipment. James Irvine, Jr., and C. S. Chapman head the company.

The Southern California Edison Co., Los Angeles, has plans for an addition to its power station at Colton, Cal., to cost $250,000 with equipment.

The Common Council, Pasadena, Cal., is arranging for a bond issue of $250,000, the proceeds to be used for extensions in the municipal electric power plant and the purchase of additional equipment.

The Columbia Valley Power Co., Madras, Ore., is planning the construction of a hydroelectric power house in Deschutes County, estimated to cost $750,000 with machinery.

The Oregon-American Lumber Co., Vernonia, Ore., has plans for the erection of a new one-story mill, 92 x 300 ft., and power house, estimated to cost $125,000 with machinery.

The Simple Auto Wheel Co., Tacoma, Wash., has plans for a new one-story works at 2302 Edison Street, to manufacture automobile wheels.

The White Co., Cleveland, manufacturer of motor trucks, has acquired a half-block of property bounded by Eleventh, Twelfth, Market and Mission Streets, San Francisco, 275 x 550 ft., as a site for a new factory branch to cost $200,000 with equipment. G. A. Urquhart is vice-president.

Detroit

DETROIT, Dec. 24.

THE Fisher Body Corporation, General Motors Building, Detroit, has organized the Fisher-Hurd Lumber Co., to take over and operate 100,000 acres in Tennessee, Arkansas and Louisiana, recently acquired. A number of mills will be constructed, with power plants and electrically-operated machinery. O. P. Hurd, Memphis, Tenn., will be president and general manager of the new company.

The Detroit Concrete Receptacle Co., 4225 Michigan Avenue, Detroit, has arranged for an increase in capital from $100,000 to $350,000 for expansion, a portion of the proceeds to be used in connection with a new plant in the Woodward Heights section.

The Northrop Lock Co., Orion, Mich., manufacturer of special locks and locking devices, is negotiating with the Chamber of Commerce, Adrian, Mich., relative to a site for a new plant. It is proposed to remove to this location and provide equipment for larger production.

The Ford Motor Co., Highland Park, Mich., is taking bids on a general contract for its assembling plant and machine works on Riverside Boulevard, Memphis, Tenn., estimated to cost $750,000 with equipment. Bids will also be called soon for the construction of a one-story assembling works on Roy Street, Seattle, 50 x 310 ft. Albert Kahn, Marquette Building, Detroit, is achitect for both structures.

The Miller-Seldon Electric Co., 1259 Park Street, Detroit, manufacturer of electric equipment, has filed plans for a three-story plant on McGraw Street, estimated to cost $85,000.

The Hupp Motor Car Corporation, Mt. Elliott and Milwaukee Avenues, Detroit, is arranging for a stock issue of $3,000,000, a portion of the proceeds to be used for expansion.

The Kalamazoo Sanitary Mfg. Co., Kalamazoo, Mich., is arranging an extension program to double the capacity of its plant. A number of new buildings will be erected in the spring and considerable additional machinery purchased.

The Sutherland Paper Co., Kalamazoo, Mich., will commence the construction of an addition for its carton department, to cost $80,000 with machinery.

The Detroit School Equipment Co., Penobscot Building, Detroit, has taken over the former plant of the Michigan Truck & Lumber Co., Holly, Mich., for a branch factory to manufacture desks and kindred equipment.

The Wood Products Co., Grand Rapids, Mich., recently formed with a paid-in capital of $30,000, is perfecting plans for a factory to manufacture lamps and kindred specialties. Headquarters have been established at 310 Winter Street. Frank M. Curran is president, and John Drieborg, secretary, treasurer and general manager.

St. Louis

ST. LOUIS, Dec. 24.

PLANS are being arranged by the Missouri Marble Quarries, Inc., St. Louis, G. C. Breaker, Boatmen's Bank Building, head, for a new plant in the vicinity of Rush Tower, Mo., on the Mississippi River, with power house, estimated to cost $150,000, including machinery.

The Arkansas Central Power Co., Little Rock, Ark., will build a one-story addition to its local power plant, 25 x 105 ft., with equipment estimated to cost $125,000. Other extensions and improvements will be made. C. J. Griffith is general manager.

The Tri-Cities Power Co., Bolivar, Mo., recently organized, will commence the construction of a new power house, with transmission system, to cost approximately $75,000. Joseph M. Diel is secretary.

The Warren Steel Castings Co., 3400 Maury Avenue, St. Louis, has awarded a general contract to the Edmunds-Lund Construction Co., Merchants' La Clede Building, for its proposed one-story foundry, 60 x 200 ft., at the Kingshighway and Fairview Avenue, to cost about $65,000. C. E. Raydon is president.

Manual training equipment will be installed in the three-story high school to be erected on the Natural Bridge Road, St. Louis, estimated to cost $1,500,000, for which foundations will be laid at once. The Board of Education, 911 Locust Street, is in charge.

The Stimson Lumber Co., Memphis, Tenn., plans the construction of a power house at its proposed saw and lumber mill on 45 acres, at Dumas, Ark., to cost about $125,000.

The Common Council, Carter, Okla., plans the installation of electric pumping machinery in connection with a new waterworks system. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are engineers.

Bids will be received by M. Peshek, Jr., city clerk, Oklahoma City, Okla., until Jan. 15, for equipment for the municipal waterworks, including gates and operating mechanisms, steel flashboards and mechanisms, etc., as per plans on file.

The Stratton-Warren Hardware Co., Memphis, Tenn., has acquired the plant and business of the Kidd-Bossinger Hardware Co., Little Rock, Ark. Plans are under consideration for expansion and the installation of additional equipment.

The Common Council, Stillwater, Okla., plans the installation of electric pumping machinery at its new waterworks, for which plans are being drawn by V. V. Long & Co., Colcord Building, Oklahoma City, Okla., engineers.

The Van Veneer Co., Malvern, Ark., has plans for a new one-story factory, 100 x 210 ft. Machinery will be electrically-operated. The company is in the market for a 150 kw. generator, motors and other equipment.

Manual training equipment will be installed in the proposed three-story high school to be erected at Guthrie, Okla., estimated to cost $300,000, for which bids will soon be asked on a general contract. Hawk & Parr, Magnolia Building, Oklahoma City, Okla., are architects.

Indiana

INDIANAPOLIS, Dec. 24.

FIRE, Dec. 17, destroyed a portion of the plant of the Lindley Box & Paper Co., Marion, Ind., with loss estimated at $150,000, including machinery. It will rebuild at once, increasing the size of the former works. L. R. Lindley is president.

Manual training equipment will be installed in the new two-story junior high and grade school to be erected at Marion, Ind., estimated to cost $225,000, for which foundations will be laid at once. Hiram Elder, Custer Building, is architect.

The Carmichael Safety Gate Co., Indianapolis, recently organized with capital of $50,000 to manufacture patented safety gates for railroad grade crossings, has perfected arrangements with the Castle Machine Co., 143 Neal Avenue, to carry out initial production at its shops and a portion of the works will be given over to this service. H. E. Carmichael is president and Charles Lutz, secretary and treasurer.

V. Milcarek, Michigan City, Ind., care of Ohlgrim & Boonstra, architects, is having plans drawn for a new plant, with main two-story and smaller adjoining buildings to manufacture tile products, estimated to cost $300,000 with machinery. A power house will be built.

Fire, Dec. 17, destroyed a portion of the plant of the Hinde & Dauch Paper Co., Muncie, Ind., manufacturer of corrugated paper products, with loss estimated at $60,000. It is planned to rebuild. Headquarters of the company are at Sandusky, Ohio.

Bids will be received by the Board of Public Works, South Bend, Ind., until Jan. 16, for a turbine driven centrifugal pumping unit and auxiliary equipment for the municipal water works, estimated to cost $30,000 installed. Plans and specifications at the office of the City Water Works.

The Indiana General Service Co., Marion, Ind., is planning for the installation of generating and auxiliary machinery at its local power plant, to replace the equipment destroyed by fire Dec. 15, with loss estimated at $25,000.

Electric pumping equipment will be installed at Seymour, Ind., in connection with a new sewerage plant and system, estimated to cost $240,000. C. H. Hurd, Indianapolis, is engineer. The City Council, Charles L. Kessler, mayor, is in charge.

W. L. Bedford, Indianapolis, is organizing the Reliance Auto Shop, to establish a plant at 232 Caven Street, for the manufacture of automobile bodies.

The Terre Haute Paper Co., Terre Haute, Ind., operating two paper mills, has acquired the former plant and property, totaling 35 acres, of the Commercial Distillery for enlargements. W. G. Clark is general manager.

Canada

TORONTO, Dec. 24.

E. LAFLAMME, Montmagny, Que., is establishing a factory for the manufacture of furniture and will purchase equipment for making chairs, wood products, etc.

The Page-Hersey Tubes, Ltd., Church Street, Toronto, contemplates the erection of new finishing building, of brick and steel.

The Winnipeg Electric Railway Co., Winnipeg, contemplates construction of a coal gas plant, consisting of 17 combination gas ovens of the Becker type having a capacity of 6.8 net tons of coal per charge, together with producer plant and coal and coke handling equipment.

The municipality of High River, Alta., contemplates the installation of an additional 75 hp. electric unit and equipment for a fuel power plant. S. W. Salt is secretary.

The Riverside Iron Works, Calgary, Alta., has started work on the erection of a plant to manufacture transmission equipment, dredges for irrigation work, tractors, etc.

C. R. Tetley, 314 Beaver Hall Hill, Montreal, is preparing plans for a $2,000,000 silk factory to be erected at Cornwall, Ont., for Courtaulds, Ltd., of Coventry, England. The architect will call for tenders early next spring.

F. W. Clarke, 17 St. James Street, Quebec, has secured forest concessions on Manicougan River and will build a sawmill to cost $1,000,000. Construction will start in the spring.

Hunt Brothers, Ltd., London, Ont., contemplate the erection of a grain elevator at Point Edward, Ont., with capacity of 1,000,000 bu.

Western Canada

The G. W. Murray Co., Ltd., Winnipeg, has started work on the erection of a wood-working factory on Market Street, to cost $40,000.

The McLean Shingle Co., Ltd., New Westminster, B. C., is having plans prepared for a shingle mill at Fraser & Pitt River Junction, at a cost of $60,000.

The superintendent of lighthouses, Ketchikan, Alaska, will receive bids until Jan. 21, 1924, for two internal combustion engine-driven air compressors.

The Alberta Flour Mills, Calgary, Alta., is asking for complete equipment for a flour mill. W. B. Sifton is purchasing agent.

Edward E. Phillips has purchased two-acres on the waterfront, between Marne Drive and the Fraser River at Burnaby, B. C., and will erect a sawmill to cost $100,000.

Dale Machinery Co., Inc., Will Open Office

The Dale Machinery Co., Inc., will soon open offices at 308 Machinery Hall, 549 West Jackson Boulevard, Chicago, and will handle a complete line of machine tools in what is generally understood as Chicago territory. James J. Dale, until recently vice-president in charge of sales and director of the Consolidated Machine Tool Corporation of America, is president, and C. M. Robertson, manager the Chicago office of the Consolidated Machine Tool Corporation of America, has been elected vice-president. At the time that Mr. Dale, together with the late C. K. Lassiter and W. H. Marshall, organized the Consolidated Machine Tool Corporation, the physical assets of the Dale Machinery Co. were purchased, but its corporate entity remained independent. The Dale Machinery Co. in 1920 succeeded to the business of the Dale-Brewster Machinery Co., which in turn in 1916 took over the business of the Horne-Dale-Brown Co., which was organized by Mr. Dale and his associates in March, 1915. Mr. Robertson joined the Dale-Brewster organization in January, 1918, and has been with that company, the Dale Machinery Co. and the Consolidated Machine Tool Corporation ever since. From 1909 to 1918 he was associated with the E. L. Essley Machinery Co., Chicago, and for eight years prior to that was superintendent of the plant of the Colburn Machine Tool Co. at Franklin, Pa. Also actively interested in the new organization are F. C. Hermann and W. E. Bewley, until recently connected with the Chicago office of the Consolidated Machine Tool Corporation. Mr. Hermann has been with the Consolidated company and the Dale Machinery Co. since 1921, prior to which he was for one year sales representative connected with the Chicago office of the Reed-Prentice Co., Worcester, Mass. Previous to that, he was for ten years sales representative for Stocker-Rumely-Wachs Co. and the H. A. Stocker Machinery Co. at Chicago. His earlier experience was in the machinery supply business. Mr. Bewley has been for four years connected with the sales department of the Consolidated company and the Dale Machinery Co., and prior to that was for ten years identified with Manning, Maxwell & Moore, Inc.

Plans of New Companies

The John Robertson Co., Brooklyn, has been incorporated with capital stock of $500,000 to manufacture machinery and parts. The company is not in a position to announce its plans at present, but it is understood that preliminary negotiations will be cleared away by the first of the coming year. Present address is in care of L. A. Brown, 44 Court Street.

The Vitalock Co., 1721 Broadway, New York, has been incorporated with $175,000 capital stock and will manufacture an automotive device. Its product is now on the market in limited quantities. H. A. Sharpe heads the company.

The Johnson Motor Products, Inc., New York, has been organized with capital stock of $100,000 and will assemble and distribute automotive equipment. A building has been leased and the company is preparing to install equipment. The incorporators are: P. J. Holdsworth, E. Griffin and E. P. Morse, Jr. Address care of L. J. Elias, 40 Wall Street.

The Auto Carbonfoe Device Corporation, 153 West Sixty-fourth Street, New York, recently incorporated with $60,000 capital, is manufacturing an automotive device and, while part production is being done by a New York manufacturer, it is likely that other work will be placed later. Harry F. Flugge is president and treasurer.

The Super-Ear Corporation, 41 Union Square, New York, recently incorporated with capital of $100,000 to manufacture acoustic devices, is having dies made and will start production as soon as these are installed. L. S. Scher heads the company.

The National Safety Oil Burner Corporation, 53 Park Place, New York, has been organized under Delaware laws with capital stock of $50,000 to manufacture oil burners for industrial and domestic use. Plans are not definite, but in case the company does its own manufacturing it will likely locate in Bridgeport, Conn., or Jersey City, N. J. Mark de Lisser, Styles Bennett and Bert Seabolt are the principals.

The Fleischman Mfg. Co., 2695 Nostrand Avenue, Brooklyn, has been organized with nominal capital to take over an established business in the manufacture of screens and kindred wire products. Additional capital has been taken into the company and small expansion may be undertaken later. S. and B. Fleischman and B. Kwitken are the principals.

J. B. Ferguson, Inc., New York, has been incorporated with $10,000 capital stock and is manufacturing radio equipment. Its factory at 80 Beaver Street is now in operation. J. B. Ferguson, 29 Broadway, heads the company.

R. F. Rice, Inc., care of M. G. Palliser, 1 Liberty Street, New York, incorporated with $15,000 capital stock, will act as distributor of engines, motors and kindred products.

The Glide-Feinberg Fibre Box Corporation, New York, incorporated with capital stock of $50,000, will manufacture fibre containers. Address care of Kleiner & Britwitz, 299 Broadway.

The Davis Keyseater Co., 255 Mill Street, Rochester, N. Y., has been organized to acquire that part of the Davis Machine Tool Co., Inc., Rochester, which pertains to keyseating machines, in which the new company will specialize.

The Concrete Block Machine Co., Green and Columbia Streets, Newark, N. J., has been organized with capital stock of 1000 shares, no par value stock, and will manufacture a machine which makes four-ways-interlocking blocks used for construction. The company takes over a partnership that has existed a considerable period, hence full equipment is available for immediate production. P. W. Wittemann heads the company.

The General Metal Recovery Co., Denver, has been organized with capital of 1500 shares of stock to manufacture metals. It is in the preliminary stages of organization and will have definite plans in the early part of 1924. Present address is in care of H. D. Vaugh, 538 United States National Bank Building.

The Chism Mail Box Co., 2511 Union Central Building, Cincinnati, has been organized with $100,000 capital stock to manufacture apartment mail boxes. Manufacturing will be done by the Edwards Mfg. Co., Cincinnati. L. W. Chism is president.

The Baker Reduction Gear Co., 10228 Woodward Avenue, Detroit, has been organized with capital stock of $10,000 to manufacture automotive products, which are now being manufactured under contract. Earl Howe heads the company.

The Stevens Mfg. Co., 8 Merrimack Street, Lowell, Mass., has been organized with capital stock of $25,000 to manufacture shock absorbers. Its affairs are still in the experimental stage. John K. Stevens heads the company.

The Keystone Forging Co., Northumberland, Pa., has been organized as a consolidation of the company by that name and the M. F. Ford Mfg. Co. The net worth of the

consolidation is approximately $400,000. About 75,000 sq. ft. of floor space are available. Plant improvement has been completed and new machinery installed for manufacturing standard automotive forgings. The officers of the company are A. I. Spiro, president, and J. J. Axilrod, vice-president and general manager. Offices are maintained in Detroit at the General Motors Building, in New York at 347 Fifth Avenue and in San Francisco at 528 Mills Building.

The Metal Hose & Tubing Co., recently incorporated with $65,000 capital, in St. Louis, is a branch of the company by that name at Raymond and Tillary Streets, Brooklyn. All manufacturing will be done at the Brooklyn plant. Address of the St. Louis office is 1621 Pine Street. R. S. Westcott is treasurer.

The Antenna Insulator Co., 15 Bagley Street, Pawtucket, R. I., has been organized to manufacture weatherproof insulators. The company is now machining insulators for the Continental Fibre Co., Newark, Del. L. H. Bean is president.

The Ruthe Mfg Co., 109 Bank Street, Newark, N. J., has been organized to manufacture tool chests, having an equipped factory now in operation.

The Bassett Battery Co., Inc., 43 Howe Street, New Haven, Conn., has been organized to manufacture battery cases and to operate a service station. G. F. Lacy heads the company.

The Central Sanitary Mfg. Co., organized with capital stock of $40,000, has taken over the business and equipment of the Sergeant-Denning Co., Mexia, Tex., and will manufacture plumbing supplies on a small scale. J. F. Denning is president.

The McNamara Steel Development Co., 1405-77 West Washington Street, Chicago, has been organized with capital stock of $250,000 to manufacture oil well drilling bits. holders, mining bits and steel specialties. The principals of the company have been working in this direction for the last seven years. Work is bing done by contract. Allan Miller is secretary-treasurer.

The Service Maid Corporation, 308 North Michigan Avenue, Chicago has been organized to manufacture dishwashing machinery. It is having its machines built under contract. The company plans to have a plant of its own, complete for operation, within six months. T. C. Hicks heads the company.

The Key Safe Mfg. Co., care of the Berg Mfg. Co., Milwaukee, recently organized with $75,000 capital stock, is taking over a plant in operation for several years, fully equipped and ready for production. Materials used are malleable iron and bronze brass.

The Hold-Mar Vacuum Piston Co., Inc., Room 201, Chamber of Commerce Building, Newark, N. J., recently organized, is now manufacturing vacuum chambers. Casting and machining will be done by contract for a short time, after which the company purposes to build its own plant and install machinery. W. E. Holder is president.

The Atlas Aluminate Cement Co., 25 Broadway, New York, recently organized with capital of 1500 shares, no par value stock, is making a thorough investigation of aluminate cement with the expectation of manufacturing the product in the course of a few months. C. R. Hulsart heads the company.

Industrial News Items

Sale of the Anderson Foundry & Machine Co., Anderson, Ind., one of the R. L. Dollings subsidiaries now in the hands of the receivers, to a new corporation has been authorized by the court on a petition of Winfield T. Durbin, receiver of the Anderson company. The receiver has been instructed to receive sealed bids for not less than the invoice of the assets, $616,000. Bert McBride of Indianapolis is receiver of the R. L. Dollings Co. in Indiana. R. B. White of Anderson, sales manager of the Anderson company for more than four years, and associates, have made a proposition for the organization of the new company and the operation of the business. The new corporation, under the agreement of a joint committee, will have a capital stock probably of $1,800,000 of which $1,200,000 will be a common stock issue and the remainder preferred. There will also be an issue of bonds for $350,000 probably to provide working capital, bear the expense of the reorganization and for other needs.

E. S. Gorrell, of Boston, has been appointed vice-president of the Nordyke & Marmon Co., Indianapolis, to succeed Frederick E. Moskovics, who resigned some time ago to give his attention to private interests. Mr. Moskovics was recently appointed receiver for the Stevenson Gear Company, Indianapolis.

The plant of the Mosel Mfg. Co., Berlin, Conn., steel products, has been closed by order of the directors and the company is going out of business. It has an authorized capitalization of $100,000, about half of which was paid in, and was organized in 1919 by Frank J. Moran and Howard Wessel. The company is understood to have no liabilities. Included in its assets is a plant in Winchester, with equipment.

Albert T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass., is again offering prizes for pupils of schools below the college grade. The subject of the new prizes is to be "Sharing Our National Income." The first prize is $500, the second prize $300, and seven other prizes are of $100 each. Full particulars can be obtained by addressing the company.

Liquidation of the affairs of the Hercules Steel Casting Co. of Milwaukee, placed in the hands of a receiver several months ago, has progressed to the point where disposition of the property and other assets is to be made at once by Edward L. Cullen, receiver, with offices at the works, 871-881 Robinson Avenue, Milwaukee. Bids are now being received until Jan. 21, at 5 p. m. The property consists of 2½ acres, a foundry, 60 x 260 ft., with a 10-ton Vom Baur tilting electric furnace, core ovens, cranes, flasks, torches, etc.

Industrial Finance

Stockholders of the Superior Steel Corporation, Pittsburgh, at a meeting held at Richmond, Va., Dec. 10, approved a proposal of the directors for the sale of 40,000 unissued shares of common stock. These shares are to be sold to a syndicate composed of the present management of the corporation headed by James H. Hammond, chairman of the board of directors. Proceeds from the sale of the stock will be used to retire both classes of preferred stock at $115 and accrued dividends. Stockholders will be asked at a meeting to be held Feb. 15, 1924, to approve an issue of $2,750,000 first mortgage 6 per cent, 15-year sinking fund bonds.

Report of the Canadian Car & Foundry Co., Ltd., for the year ended Sept. 30, shows net income of $1,427,573, against a deficit of $586,632 in 1922.

Although details are lacking, announcement is made that arrangements have been completed with banks, whereby the Wickwire-Spencer Steel Corporation will be provided sufficient funds to care for working capital needs.

Stockholders of the Superior Steel Corporation have approved the sale of 40,000 common shares to a syndicate at $30 a share, the proceeds, together with other financing, to be used to retire on Feb. 15, next, the 32,500 shares of preferred stock outstanding at $115 and accrued dividends. Another stockholders' meeting has been called for Feb. 15 to vote on the directors' recommendation to sell $1,750,000 6 per cent first mortgage bonds which, if passed will make outstanding $2,750,000 in bonds and 100,000 common shares.

An arrangement has been reached between the Bridgeport Brass Co., Bridgeport, Conn., and the United States Department of Justice, whereby the former has turned over $400,000 to the Government in settlement of claims made by the war department that the company had been overpaid $700,000 on ordnance contracts.

A preliminary certificate of dissolution has been filed by the Middlesex Machine Co., Inc., Hartford, Conn. Claims may be sent to W. I. Charter, E. Y. Judd and John F. Forward, a majority of the directors.

The Gulf States Steel Co. has purchased approximately 75 per cent of the 6 per cent second preferred stock outstanding at the close of 1922, leaving $15,000 still outstanding. In addition, the company has outstanding $2,000,000 7 per cent first preferred stock and 112,120 shares of common. It has no funded debt.

Plans are in progress to increase the authorized common stock of the Laconia Car Co., Laconia, N. H., from 10,000 to 65,000 shares of no par value. In lieu of the accumulation of unpaid dividends on the preferred stock, 10,000 of the new common shares will be given preferred stockholders. At the same time the preferred stock will become convertible into common stock on a basis of 4½ shares of common for each share of preferred.

Directors of the Youngstown Sheet & Tube Co. have declared a quarterly dividend of $1.25 per share on common stock and $1.75 on preferred. The common dividend is unchanged from the previous payment and will bring the total distribution this year on the common stock to $4.75 per share.

Net income of the Penn Seaboard Steel Corporation for the ten months ended Oct. 31, after all charges, was $27,497. Profit and loss surplus as of that date was $3,228,289, compared with $4,000,541 on Jan. 1. Current assets of $2,325,179 were shown, against current liabilities of $1,538,643.

A. B. McCall of Kenosha, Wis., has been appointed trustee of the bankrupt estate of the K. & F. Mfg. Co., Kenosha, manufacturer of tools, dies, jigs and metal products. H. G. Maddock has served as receiver since involuntary proceedings were instituted in September. Mr. McCall served as trustee of the Winther Motors, Inc., Kenosha.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.40c. to 4.70c.	.....
Nos. 22 and 24	4.45c. to 4.85c.	5.10c.
No. 26	4.50c. to 4.90c.	5.15c.
No. 28	4.60c. to 5.00c.	5.25c.
No. 30	4.80c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.70c. to 5.10c.
No. 16	4.85c. to 5.25c.
Nos. 18 and 20	5.00c. to 5.40c.
Nos. 22 and 24	5.15c. to 5.55c.
No. 26	5.30c. to 5.70c.
No. 27	5.45c. to 5.85c.
No. 28	5.60c. to 6.00c.
No. 30	6.05c. to 6.45c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—41	—24	⅛ in. Butt...	— 4	+19
¼ in. Butt...	—46	—32	¾ in. Butt...	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap....	— 5	+14
7-8 in. Lap..	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap..	—34	— 6	7-12 in. Lap..	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 27¼c.
Brass tube, seamless	22 c. to 23 c.
Copper tube, seamless	23½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 21c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20		
			Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb..	$6.55	$6.30
		90 lb..	6.65	6.40
		100 lb..	6.75	6.50
IC..	$12.55	$10.70	IC..	7.00	6.75
IX..	13.95	12.55	IX..	8.25	8.00
IXX..	15.55	13.75	IXX..	9.50	9.25
IXXX..	17.10	15.30	IXXX..	10.75	10.50
IXXXX..	18.85	16.80	IXXXX..	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	50c.
Bar	58c. to 60c.

Copper

Lake ingot	15¾c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¾c. to 9c.
Bar lead	10½c. to 12c.
Solder ½ and ½ guaranteed	34¾c.
No. 1 solder	32¾c.
Refined solder	28¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	11½c. to 12½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.

Old Metals

The market continues quiet and sluggish. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.25
Copper, light bottoms	9.00
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	8.00
Lead, heavy	6.25
Lead, tea	5.25
Zinc	4.00
Cast aluminum	16.00
Sheet aluminum	16.00